

Nursing Education

A Promising Market for Interactive Video

by

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Editor/Publisher
Nursing Educators Microworld
13740 Harleigh Court
Saratoga, CA 95070
408/741-0156

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ISBN 0-936999-10-1

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Executive Summary

Nurse educators and videodisc developers want to see interactive video become a significant part of nursing education. Both groups must work together to convince hospital administrators and school of nursing administrators that interactive video is a solution to many of their problems. Ultimately, the best way to do this is to demonstrate that interactive video is a cost-effective means of dealing with these problems.

Economic Pressures on Hospitals

The Nursing Shortage. The nursing shortage is widespread and is having a significant impact on hospital budgets. Surveys by the American Hospital Association and others indicate that in 1988, 78 percent of the nation's hospitals reported a shortage of nurses.

Bed Closures. Fewer nurses are available to care for patients, forcing some hospitals to close their emergency rooms and hospital beds. Closure of one hospital bed can result in as much as \$350,000 per year in lost revenues.

Agency RNs. To keep hospital beds open, hospitals are hiring nurses from temporary agencies. The salary for these temporary nurses is twice that a hospital employed RN.

RN Recruitment. Hospitals are forced to recruit heavily for nurses. According to the 1988 National Association for Health Care Recruitment, 1988 recruitment budgets averaged \$154,000 per hospital — up 35 percent from 1987.

RN Salaries. To attract the best and the brightest nurses, hospitals are increasing nursing salaries. Salary wars in southern California have increased base salaries to between \$30,000 and \$50,000. With a 20 percent night shift differential, some hospitals are paying night nurses as much as \$60,000 a year.

Cost of Replacement. With RNs constantly being attracted to hospitals with more satisfying work environments, the job turnover rate is between 13 percent and 20 percent per year. Adding together the costs of recruitment, paying temporary nurses, and orientating newly hired nurses, it can cost a hospital \$15,000 to \$20,000 to replace just one RN.

RN Orientation. In many cases, newly hired experienced nurses collect a salary while sitting through an orientation that is only partially relevant to them. Hospital administrators would like to find a way to reduce the cost of orientations programs, which can be as high as \$96,000 per year.

Solutions to Problems Faced by Hospital Administrators

Hospital administrators confronted with these expenditures are looking to increase staff nurse retention and productivity, increase the return on dollars spent for mandatory education, and decrease costly litigation due to on-the-job errors by under trained nurses. The steps many administrators can take are:

Accelerate Orientation. Many hospitals have turned to a competency-based, individualized orientation. The knowledge and skill deficits of each new RN employee are identified and corrected. The program is customized at different levels for experienced RNs, RNs employed to work in a new specialty area, and for recent nursing school graduates.

Cross-Training. Productivity is increased with cross-training, which allows RNs to function safely in more than one area of the hospital. Cross-training also reduces costly mistakes and the possibility of legal action.

Management Skills. Hospitals with the lowest staff turnover are ones which provide a supportive environment, professional growth, and professional recognition. Nurse managers can help create this constructive work environment by applying human resource management skills. Unfortunately, few nurse managers have been formally trained in this area.

Business Skills. Due to recent economic pressures, hospitals increasingly are being managed as a business. Nurses also need to learn essential business skills to manage nursing units efficiently.

Nursing Skills and Competency. Nurses are always in need of updates on new drugs, new equipment, and new procedures. An increasing number of educational programs are mandated by state, federal, and professional organizations.

Reducing Litigation. The threat of litigation is a big economic incentive to providing nurse education that will result in increased patient safety. Two common problem areas are medication errors and patient falls.

Searching for a Training Solution

While all hospital administrators recognize the need for educational programs, the big problem is implementation. When a hospital is short-staffed, it is difficult to schedule time for groups of nurses to listen to educational presentations. In addition, when nurses are being paid \$25 to \$30 an hour, it becomes very costly to place them in lengthy training sessions.

Hospital administrators are looking for educational programs that will reduce the time for learning, obviate the need for removing groups of nurses from a patient unit, promote learning among nurses, and — most important of all — assure learning.

Economic Pressures on Schools of Nursing

Reduced Enrollment. Enrollments in schools of nursing peaked in 1983 and have been on the decline ever since. As enrollments decline, so does the available dollars with which to operate the school. In order to deal with the economic pressures placed upon nursing schools, administrators are forced to find ways to attract larger numbers of qualified students.

Student Recruitment. To increase enrollments, administrators are taking a close look at the populations from which students can be recruited. Because it is a buyer's market, potential students can be selective in choosing a school of nursing.

The best and brightest high school students and second-career students will be attracted to a school with graduates who consistently pass the licensure examination. The thousands of RNs returning to school for a baccalaureate degree will be looking for schools which offer accelerated learning of essentials, a curriculum that

is relevant to individual needs, and academic credit for previously acquired nursing knowledge and experience.

Cutting Costs. In addition to stepped-up recruitment efforts, school administrators must find more cost-effective means to accomplish their basic mission — preparing students to pass the RN licensure exam (NCLEX) in preparation to practice nursing.

Maximizing Faculty Expertise. Rather than having faculty spend all their time dispensing basic knowledge, administrators must allow them to teach the more complex skills so important to nursing practice today — decision-making, critical thinking, problem-solving, and retrieving, collecting, analyzing and communicating information.

Summary

In view of the economic pressures on schools of nursing, administrators are eager to design a curriculum that will reduce redundancy, increase relevancy, speed the learning of essentials, and maximizes the expertise of their faculty.

Therefore, the driving forces for both hospitals and schools of nursing administrators are solutions that will attract and retain staff nurses and students, accelerate the learning of essentials, and enhance productivity by maximizing human resources.

Attributes of Interactive Video

Reduced Learning Time. Extensive research shows that computerized educational materials results in the same degree of learning as traditional methods, but in one-third to one half the time.

Flexible Access Time. Unlike traditional methods of classroom instruction, computerized education and training programs can be accessed at any time. This is an important attribute for a profession that requires round-the-clock employment. Flexibility in access time is also important for the part-time student. Of the nearly 50,000 RNs enrolled in baccalaureate programs, 70 percent are part-time students.

Flexible Presentation. Unlike traditional methods in which all learners are given the same information, computerized learning materials can be individualized to meet the specific needs of each learner and thus reducing redundancy.

Cost-effective. Many vendors and educators have compared the cost of traditional learning methods with the use of computerized programs and demonstrated substantial fiscal savings with interactive video.

Appeals to Adult Learners. The majority of those who need education and training in nursing today are adult learners. The average age of the two million RNs in clinical practice is 41.5 years old. The average age of the ADN student is 30 years old. The average age of the returning RN student is 31. ADN students and the RN students represent 70% of the nearly 200,000 students enrolled in nursing schools.

Incorporation of Video and Audio. Health care depends greatly upon sight and sound. Nursing students need opportunities to see and hear conditions which can not be represented in textbooks or on computer screens. Interactive video can help students to make clinical assessments, to generate appropriate nursing diagnoses, and to make clinical decisions by allowing them to see and evaluate a patient's color, observe breathing patterns, and hear breath and heart sounds.

Barriers to Implementation

Administrators are not racing out to buy and implement interactive video technology. Although many observers may feel that one barrier to widespread acceptance is cost, in schools of nursing, research has shown the biggest reasons given for the lack of technology is not cost, but a lack of faculty time and skill.

Although the biggest reason given by hospital educators was cost, in that same survey 94 percent of the respondents also reported purchasing videotapes regularly. Videotape also can be an expensive medium, but is widely used because there are hundreds of titles that serve the needs of hospital educators.

Which points out another frequently cited barrier to use of microcomputers in schools and hospitals. The lack of good software, and not the cost of the technology, is the most likely explanation for schools and hospitals not owning and using microcomputer and interactive video technology.

Growth of Interactive Technology

Microcomputer Acquisition

Despite complaints about cost, 71 percent of the schools of nursing and 41 percent of hospital education departments own microcomputers. The growth of computer hardware is clearly related to an increase in available software. The number of nursing software listings for microcomputers increased from 150 in 1985 to nearly 400 in 1989. If the growth in software and in hardware acquisition continues at its present rate, every school of nursing and just about every hospital education department will own and use microcomputers by 1997.

Interactive Video Acquisition

Regarding interactive video, seven percent of the schools of nursing and less than one percent of the hospitals own interactive video hardware. In addition, only 42 interactive videodisc programs even somewhat appropriate for nursing education are available for purchase. This reflects a hardware and software penetration which is comparable to microcomputer penetration in 1983.

However, when you compare the tremendous needs of nursing education for interactive video technology with the benefits that it offers, it is easy to believe that its growth will at least match the ten percent growth rate of microcomputer acquisition. At that rate, almost all schools of nursing will own interactive video hardware by 1999. In the same year, just over half of the hospital education departments will own interactive video hardware.

Forces Expediting Acquisition

At least five forces are expediting the acquisition of interactive video hardware:

Reduced Technophobia. Because the microcomputer has paved the way, nursing educators, administrators, and students are experiencing a lesser degree of technophobia regarding interactive video technology.

Hardware Placement. It is becoming easier to get hardware into hospitals. A number of groups are either donating interactive video equipment or making it available on loan or at a reduced price.

Establishment of FITNE. The Fuld Institute for Technology in Nursing Education (FITNE) has been single-handedly responsible for installing interactive hardware in 75 schools of nursing (five percent of all schools) in just one year.

Computerized NCLEX-RN. Many school of nursing will be compelled to integrate interactive video technology because of the development of a computerized examination by the National Council of State Boards of Nursing. Administrators will want to insure that their students are comfortable learning and testing on computerized systems.

Magnetic Pull. The year 2000 itself may accelerate these trends. According to futurist John Naisbitt, there is a psychological fascination with the end of an old and the beginning of a new century. The pull toward the end and beginning of a new millennium is even stronger. Thus, during the next 10 years the pull toward interactive videodisc integration may be irresistible.

The most important forces expediting the integration of interactive video technology are commercial developers—who must work with educators to provide solutions to problems faced by hospital and nursing school administrators—and educators—who must work with commercial developers to convince administrators that videodisc technology is a solution to many of the economic and educational problems they face. By working together, the widespread use of interactive videodisc technology will become a reality before the turn of the century and the new millennium.

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Chapter 1

Introduction to the Nurse

Responsibilities and Activities of Nurses

The nation's RN population tops 2,000,000. Of these licensed Registered Nurses (RNs), 80 percent are employed in nursing, with 1,320,000 employed by hospitals.

In Florence Nightingale's era, many of the nurse's tasks had to do with house-keeping, meal preparation, and patient hygiene. By the 1940s, nurses were performing almost all the skills that had been the physician's domain in Miss Nightingale's time. Today, many of the physician's tasks of the 40s — such as changing dressings, reading blood pressures, performing physical examinations, giving injections, and handling sophisticated monitors and machines — are now routinely performed by nurses.

The American healthcare system, and consequently the nurse's role, is being transformed by a variety of factors including new technologies, new healthcare delivery systems, an aging population, new requirements from a health-conscious "baby boom" generation, and new mechanisms for cost control.

The type of care given by a nurse is predicated on the employment setting. For example, in acute care settings such as the hospital, outpatient surgical or emergency centers, the focus is on curing and treating illness. In community health set-

tings such as the home, extended care facilities, and nursing clinics, the focus is on health promotion, health maintenance, and illness prevention.

The Role of the Nurse in a Hospital

Patients go to physicians to be diagnosed and, if possible, to be cured of their ailments. Patients go to hospitals because they need skilled nursing care. It is the responsibility of the nursing staff to provide 24-hour care for hospitalized patients. The professional nurse works with patients and their families to make sure that patients:

- receive the appropriate treatments and medications;
- are relieved of pain and discomfort;
- are encouraged to engage in self-care activities as much as possible;
- are kept informed of their rights and responsibilities as consumers of healthcare;
- have every opportunity to achieve an optimal state of health and well-being.

The acute-care center provides nursing care 24 hours a day, 7 days a week. Generally staff nurses are scheduled to work 40 hours a week. Most hospitals staff in three eight-hour shifts: 7am to 3:30pm (day shift), 3pm to 11:30pm (evening shift) and 11pm to 7:30am (night shift). Some hospitals schedule four 10-hour shifts or three 14-hour shifts per week at the same weekly pay as those working the usual five 8-hour shifts.

Thus, hospital staff nurses are available to the patient around the clock. All other encounters with healthcare providers, physicians included, are intermittent. The staff nurse is the primary link between the patient and the many components of the healthcare system.

In the nation's 6,872 hospitals, staff nurse activities and responsibilities include:

- providing quality assurance and safety measures;
- planning and managing patient care;
- meeting the acute physical needs of patients;
- monitoring patients at risk;
- assisting patients with their mobility needs;
- controlling pain;
- cognitively and emotionally preparing patients for and ensuring safety during procedures;

- teaching patients and family;
- meeting patient's acute psychosocial needs;
- supporting the patient's family;
- developing, managing, and teaching assistant staff members such as LPNs and aides;
- checking physician orders for contraindications; and
- implementing physician orders for diagnostic procedures and therapy.

Once admitted to a community hospital, patients are segregated into specialty units according to the diagnosis or reason for admission. In each one of these units, the staff nurses possess different types of expertise to effectively provide different types of care. What follows are brief descriptions of the variety of nursing care units found in a community hospital, and the special care given by each unit's staff nurses.

Medical Nursing

Patients are admitted to hospital medical units for diagnostic work-ups, for evaluation and adjusting medical therapy, and for supportive care of acute and chronic illnesses. Nursing care in these units is focused on preparation for diagnostic procedures, monitoring effects of therapy, provision of education, support, and counselling for the patient and his family.

Surgical Nursing

Patients are admitted to surgical units before and after surgery. The evening before surgery, the nurse makes sure that all preparations for surgery are completed. In the morning, the nurse administers pre-operative medications. When the major effects of anesthesia have worn off, the patient is returned to the surgical unit from the recovery room. From postoperative admission to the surgical unit until discharge, the staff nurse assesses recovery, monitors for complications, and prepares the patient for discharge.

Obstetrical Nursing

Obstetrical nurses care for mothers before, during, and after the birth of their babies. Before delivery, the nurse monitors and evaluates the progress of labor and the potential for complications in both mother and baby. After delivery, new mothers are admitted to the obstetrical or postpartum unit. Here, the nurse monitors recovery from delivery, supervises a return to normal activities, and teaches the mother about personal care, and care of the new baby.

Pediatric Nursing

Children from infancy to age 16, with acute and chronic problems, are admitted to the pediatric unit. Pediatric nurses monitor the child's condition, administer medications and treatments, and prepare patients and their families for diagnostic procedures or surgery.

Critical-Care Nursing

While there are a variety of special critical care units in large medical centers, many facilities admit all patients who need intensive care to one critical-care unit. Special critical-care units include cardiovascular units, coronary care units, pediatric and neonatal intensive care units, burn units, and trauma units. The one commonality is that patients in these units need intensive nursing observation and care.

Patients in these units are critically ill. Achieving and maintaining physiological stability is the main goal in these units. The nurse monitors and evaluates the stability of all bodily functions, relieves pain, administers medication, fluids, and therapy, coordinates care given by a host of technicians and physicians, and provides care, comfort, and information to families.

Staff Nurse

Staff nurses are the life-blood of a hospital and yet, until the recent shortage of nurses, they have been undervalued and under paid. What follows are the range of staff nurse salaries across the country. Included in the maximum are differentials for working the less-desirable evening and night shifts. Until the shortage, wage compression was a serious problem. Nurses who had devoted many years of practice and had accumulated untold experience, were paid little more than the starting salary of a new graduate. Fortunately, this situation is changing.

Table 1.1: Salaries of Staff Nurses, 1984, 1987 and 1989

Area	1984 Average	1987 Range	1989 Range
National	\$22,394	\$16,300-41,300	\$17,500-56,400
Northeastern		16,300-41,000	20,600-56,000
Southern		17,200-41,300	19,500-45,000
North Central		18,000-36,000	17,600-43,800
Western		18,100-40,700	17,500-52,400

Source: US Department of Health and Human Services, Division of Nursing, June 1986. National Association for Health Care Recruitment, June 1987, in AJN January, 1988, and National Association for Health Care Recruitment, June 1989, in Nursing '89 September, 1989.

Clinical Nurse Specialist

The clinical nurse specialist (CNS) is the nursing expert or the practitioner of advanced nursing in a specialty such as medical-surgical nursing, maternal-child health, mental health, oncology, gerontology nursing, or other specialty areas. These specialists usually work in acute-care hospitals where most divide their time between direct nursing practice and educating nursing staff, other health care workers, and patients. They conduct clinical research, and advise other groups within and outside the hospital. Clinical specialists have a master's degree and also must meet other eligibility requirements for certification.

The median clinical nurse specialist salary in 1989 is \$41,900, ranging from a low of \$35,100 to a high of \$48,100—equal to the highest paid professor in either an ADN or BSN nursing program.

Nursing Administrators

Nursing Executive, Director, or Administrator of Nursing

The primary goal of nursing administration in any nursing service setting is the delivery of safe, efficient, cost-effective nursing. The nurse executive frequently has corporate responsibilities. In modern hospitals, the position of director of nursing or nursing administrator is frequently elevated to the level of vice president, reflecting the new philosophy of the hospital as a corporate business.

The director of nursing services is responsible for establishing and maintaining standards for all nursing care provided; determining nursing policy and procedure and supervising its implementation; collaborating with other executives and nurse managers in strategic and long-range planning; acquiring and allocating human, material, and financial resources for nursing activities; and providing leadership in human resource development and management.

The nurse executive is a registered nurse who holds a minimum baccalaureate degree in nursing and most often has a graduate degree in nursing or a related field.

The value and increased responsibilities of these new nurse executives is reflected in the substantial increase in their salary range.

Table 1.2: Average Salaries of Directors of Nurses, 1984,1987, and1989

Area	1984 Average	1987 Average Low & High	1989 Average Low & High
National	\$32,982	\$39,335 & 54,878	\$25,400 & 125,000
Northeastern		40,264 & 53,409	28,400 & 100,000
Southern		32,970 & 48,120	27,800 & 85,000
North Central		38,957 & 58,027	25,400 & 105,100
Western		43,389 & 59,305	30,000 & 125,000

Source: US Department of Health and Human Services, Division of Nursing, June 1986. National Association for Health Care Recruitment, June 1989 in Nursing '89, September, 1989.

In most hospitals, the assistant director of nursing services, the director of staff development, the director of infection control, and the clinical nurse specialists report directly to this nurse executive. Nursing supervisors report to the assistant director.

Nursing Supervisor

Nursing supervisors supervise the nursing care given around the clock in a group of nursing units or, in some cases, the entire hospital during the evening and night shifts. In the absence of the head nurse or nurse manager, nurse supervisors are the first line policy and procedure trouble-shooters and decision-makers. They may pitch in and help during emergencies, oversee repairs, and retrieve essential equipment and medications during the night.

Head Nurse or Nurse Manager

These first line managers are responsible for the functioning of a single nursing unit. In many hospitals today, nursing units operate somewhat autonomously, with budgets and policies that reflect their unique functions. The nurse manager is responsible for hiring, orienting, scheduling, and evaluating personnel; planning and monitoring the unit budget; purchasing, maintaining, and re-ordering equipment and supplies; coordinating nursing service activities with other hospital departments; consulting with physicians; and formulating unit policies and procedures.

The nurse manager is a registered nurse prepared with a minimum BSN. A graduate degree in nursing or a related field and certification in nursing administration by a nationally recognized nursing organization is recommended.

Table 1.3: Average Salaries of Head Nurses, 1984,1987 and 1989

Area	1984 Average	1987 Average High & Low	1988 Average High & Low
National	\$25,931	\$26,139 & 36,235	\$29,927 & 41,682
Northeastern		25,926 & 34,692	31,448 & 39,880
Southern		24,974 & 36,545	27,998 & 39,880
North Central		25,047 & 34,942	28,392 & 40,157
Western		28,973 & 40,285	32,895 & 45,891

Source: US Department of Health and Human Services, Division of Nursing, June 1986. National Association for Health Care Recruitment, June 1989, in Nursing '89, September 1989.

Staff Development or Inservice Education Director

The director of this department is responsible for planning, organizing, and implementing the hospital orientation for new employees, continuing education and training programs for all employees, and the educational programs mandated by JCAH, state, local, and hospital policies. The director develops a curriculum that ranges from hospital procedures to management and supervision techniques; organizes lectures, training manuals, examinations, certification procedures, visual aids, reference libraries and other aids to learning; prepares the budget and determines allocation of funds; evaluates the effectiveness and application of learning programs; and organizes programs that include other healthcare experts such as dietitians, physicians, nursing consultants, and administrators.

The educational preparation for these directors varies from hospital to hospital. Some are nurses and some are human resource development specialists. Some are prepared at the master's level and, most recently, some are prepared at the doctoral level.

The 1988 income of the Director of Education or Director of Staff Development ranged from \$39,100 to \$50,000, with a median of \$45,100 and varied according to the hospital's bed size.

Table 1.4: 1988 Inservice Director Salaries by Hospital Bed Size

0-99 Beds	100-199	200-299	300-599	600-999	1000 +
\$28,100	\$31,500	\$33,300	\$39,700	\$40,400	\$49,900

Source: Hospital Compensation Service analysis in Nursing 89, January, 1989.

Nursing Instructors

In large medical centers, as many as 30 full-time instructors report to this director. Nursing instructors are RNs who instruct students and nurses. They prepare and present orientation programs, arrange for and train new employee preceptors, prepare, administer, score, and record examinations, collaborate with nurse managers in the evaluation of new employee integration, study quality assurance outcomes to identify needs for education on specific topics and refresher classes, plan, prepare, arrange, schedule, evaluate, and document inservice programs and annual certification programs (such as CPR and ACLS and the annual JCAHO mandated programs), design and disseminate educational materials and inservice schedules, review and recommend outside educational resources, and, in many hospitals, update and maintain the currency of hospital policy and procedure manuals.

Requirements for inservice instructors include a current RN license, graduation from an accredited school of nursing, and varying levels of education, length of service, and areas of experience. The minimum educational credential is usually a BSN with one or more years as a head nurse, supervisor, or nurse educator. The number of doctorally-prepared hospital educators is growing.

Nursing Roles Outside the Acute Care Hospital

The Home Health Nurse

The increasing number of agencies that provide nursing care in the home are responding to the need to reduce the ever-escalating costs of care delivered in hospitals. Indeed, nursing care in the home costs about a third as much as that provided in hospitals or nursing homes. Home health nurses provide a full range of health and social services in the home to patients recently discharged from acute care hospitals and homebound patients with chronic diseases.

Today, more complex care is being delivered in the home to patients of all age groups, though the elderly are still the primary utilizers of care at home. The Medicare hospital payment system initiated in 1983 causes patients to be discharged "quicker and sicker." They need more comprehensive care and more instruction from their home care providers than they did even two years ago. Technology has made it possible for nurses to provide treatments such as chemotherapy, dialysis, enterostomal therapy, respiratory control, intravenous pain control, and intravenous nutrition in homes.

The Community Health Nurse

Community health nursing is dedicated to the promotion and preservation of the health of populations. Health promotion, health maintenance, health education and management, coordination, and continuity of care are provided for individuals, families and groups in a community.

In community health nursing, two levels of practice depend upon the level of educational preparation. The generalist is prepared at the baccalaureate level and the community health specialist prepared at the master's level. The generalist provides care primarily to individuals, families, and groups in a wide range of settings and participates in the community-wide assessment, planning, implementation and evaluation of health programs and services.

In addition to all the functions of the generalist, the master's or doctorally prepared community health nurse specialist also engages in research, theory, and policy testing and development. The skills and knowledge of this specialist include epidemiology, demography, biometrics, community structure and organization, community development management, program evaluation, and policy development.

The Nurse in Public Health Service

While community health nursing is supported by the city, county, or state, Public Health Service is a Federal organization. Public Health Service nursing positions encompasses a variety of settings from the National Institutes of Health in Bethesda, Maryland, to Indian reservations in New Mexico; from the Tennessee valley foothills to an inner-city clinic. Virtually every nursing specialty is represented in the Public Health Service. Besides making home visits, public health nurses also work in tuberculosis and chest clinics, venereal disease clinics, immunization clinics and well-baby clinics — where they interview patients, collect specimens, dispense medication and assist the clinic doctor in giving follow-up care. The Public Health Service employs through two personnel systems, the civil service and the commissioned corps. The top-ranking official is the Surgeon General.

The Nurse in an Outpatient Clinic

The hospital outpatient department may be within, next to, or a satellite of a hospital. Its primary purpose is the provision of scheduled ambulatory care. Service may include followup of inpatient care, evaluation of persons referred for consultation, performance of diagnostic studies not available in office settings, or performance of surgical or radiographic procedures not requiring an overnight stay within

a hospital. The outpatient department also may serve patients with nonemergency problems on an unscheduled basis.

Since the implementation of DRG's (diagnostic-related groups, see Chapter 3) system of reimbursement, the number of patient visits to outpatient clinics has soared. It is preferable to treat patients in the outpatient clinic rather than to admit them to the hospital. Profit margins are significantly higher for outpatient treatment, as opposed to inpatient.

The nurse's role in the outpatient department is variable depending on the area of employment. The variety of clinics within this department are a litany of the body systems that can malfunction.

The Nurse in the Emergency Room

The emergency room is commonly connected to or located within a hospital and is established and equipped for the primary purpose of providing care to patients with acute illness or trauma. Some emergency rooms provide scheduled or non-scheduled nonemergency care when other facilities are not available. The emergency room has a significant impact on the hospital's inpatient population. A study by the American Hospital Association indicates that between 16 percent and 30 percent of the hospital's admissions come through the emergency department.

The emergency room is a high-cost center, both for the patient and the hospital. More than 40 percent of emergency patients require x-rays, laboratory studies, and other expensive diagnostic procedures. If the emergency room is designated the local trauma unit, specially trained physicians and nurses must be employed.

The nurse in an emergency room performs many roles. The first is triage, that is, making a rapid assessment of the patient's condition, and if other patients are waiting, assigning priority to the most serious. The nurse may need to initiate life-saving measures, begin intravenous solutions, and determine what diagnostic and therapeutic measures and procedures will be needed and arrange for them. Once the acute problems are stabilized, nursing activities include those performed in other outpatient settings.

The Nurse in an Urgent or Immediate Care Clinic

These facilities, a cross between a hospital emergency room and a family doctor's office, are usually privately owned and offer reduced cost walk-in care for minor emergencies and medical problems. They are usually open twelve hours a

day, seven days a week and are staffed with a primary care physician, an emergency nurse, an X-ray technician, a lab technician, and a secretary/receptionist.

The responsibilities of the nurse in these centers are a mixture of those required in the emergency room and outpatient clinics.

The Nurse in Surgical Day Care Centers or Surgicenters.

Within these centers, minor surgical procedures are performed on an outpatient basis. These centers are either privately owned or are satellites of large hospitals. Surgical procedures such as tonsillectomies, simple eye or cosmetic surgery, and tissue biopsies are performed here. Even cataract surgery falls under the category of simple eye surgery. The patient arrives early in the morning, recovers for several hours and then returns home.

Nurses who work in these centers perform much of the same activities as their counterparts in the acute-care hospital's surgical units, only telescoped in time and seriousness.

The Nurse in the United States Military

The highest priority of the military healthcare system is combat medical readiness. Although healthcare during peacetime may be the most visible aspect of military medicine, the primary mission is to support military forces in conflict.

The Army Nurse, a BSN who is a commissioned officer in the Corps, can be employed in any of the Army community hospitals and medical centers around the globe in any of nine nursing specialties. The Navy Nurse, appointed as an ensign, lieutenant junior grade, or lieutenant depending on education and experience, can work in a wide assortment of specialty areas.

The Air Force Nurse is commissioned as a second lieutenant and with additional education and experience, may be promoted to higher rank. In addition to providing the care given to Army and Navy servicemen and their families, Air Force nurses may also serve as flight nurses or in the aerospace program.

The Nurse In a Long-term Care Facility or Nursing Home

Patients in long-term facilities are not limited to the frail elderly. Children and young people with cystic fibrosis or spina bifida are sometimes long-term care residents since infancy. These facilities also provide intermediate care, residential care for psychiatric patients, care for those with developmental disabilities and those who need rehabilitation.

RNs are attracted to the nursing homes that have wellness programs — those that help residents to live as independently as possible. These types of programs are frequently absent in long-term facilities because Medicare and Medicaid reimbursements are greater for feeding by tube than for self-feeding retraining which requires a good bit of time and patience. In many nursing homes and long-term care facilities, the major responsibility of the RN is to supervise LPNs and nursing home aides. There is an enormous paper-work burden, especially in Medicare and Medicaid supported institutions.

A high turnover is common among all nursing home personnel, but is especially common among RNS. This high rate of turnover has been understandably attributed to the salary, which for RNs, ranges from 15 percent to 40 percent less than they can earn in hospitals.

Table 1.5: Average Annual Earning of RNs and LPNs in Nursing Homes, 1984 and 1988

Personnel & Position	Average 1984 Annual Earnings	Average 1988 Annual Earnings
RN Administrator	\$22,776	\$25,000
RN Staff Nurse	18,220	21,300
LPN Charge Nurse	13,332	16,286

Source: US Department of Health and Human Services, Division of Nursing, The Registered Nurse Population, Findings from the National Sample Survey of Registered Nurses, 1984, June 1986 and 1988 Hospital Compensation Service analysis in Nursing 89, January, 1989.

The Nurse In a Physician's Office

The white-uniformed woman who performs clerical tasks and medical assistance in a busy doctor's office can be an RN, an LPN, or a medical assistant trained in short vocational programs, or on-the-job by the physician. Activities and responsibilities vary according to the physician's wishes.

Some physicians will hire nurse practitioners to work with them, delegating many responsibilities and capitalizing on the special knowledge, experience, and talents of these nurses.

The School Nurse

While the school nurse of yesteryear kept records and did eye and ear screening exams, today's school nurse is likely to be a nurse practitioner who serves several schools, high school and elementary, in a school district.

In addition to screening exams that include lab tests such as throat cultures, these nurses perform physical examinations such as those for sports programs. They prescribe therapeutic programs, and follow-up on ear or lung infections, acne, or stress-related problems. They make referrals to other agencies, provide health guidance to students and parents, and provide consultation and care for developmentally delayed children, abused children, and children with chronic diseases such as diabetes.

The Nurse In Wellness Clinics

Springing up in shopping centers are wellness clinics like The Well Being, an outreach of Scripps Memorial Hospital Foundation in La Jolla, California. These clinics offer classes on childbirth preparation, diet, exercise, and other areas of health promotion, and provide a consumer-oriented library and a referral service. Frequently the center's director is a nurse who works with people to promote health by teaching and encouraging good health habits.

Advanced Roles in Nursing Practice

The Nurse Practitioner

The Nurse Practitioner (NP), a primary health care provider, may be the first health professional that a patient sees in any number of settings. This master's prepared nurse specializes in one area such as pediatrics, geriatrics, psychiatric-mental health, family practice or midwifery. He or she may work in the acute care setting, a physician's office, in partnership with several nurse practitioners and physicians, in industry, school districts, rural settings, or in a private practice of her own. The NP, working within established medical protocols, performs physical examinations, screens and manages routine health problems, prescribes medications, and, in some states, performs minor surgery. He or she also counsels, teaches, promotes health and prevention of disease and disability, and refers patients to other healthcare providers as needed.

The Nurse Practitioner In an Acute Care Setting

Nurse practitioners frequently are employed in the acute care setting to care for the health needs of employees. They perform pre-employment physical examinations, maintain employee health records, monitor and evaluate chronic health problems, offer health promotion programs, and provide first aid and appropriate referrals for acute physical, psychological, and social problems.

The Nurse Practitioner In Industry - Occupational Health Nurse

Occupational health is not a new specialty. Nurses were employed in the 1800s to keep industrial employees healthy. Most of the newer occupational health nurses are nurse practitioners with master's degrees. The occupational health nurse provides physical examinations, teaches health promotion and disease prevention, and provides rehabilitation services and emergency care.

Companies have learned that when highly competent nurses care for patients who receive workmen's compensation, they return to work earlier. Occupational health nurses can be found working in large industrial complexes, department stores, hotels, and offices.

The Nurse Practitioner In Nursing Clinics or Private Practice

Nurse entrepreneurs are opening their own clinics to provide health and wellness programs, private and group mental health therapy programs, well-baby, diabetic, and hypertension clinics, and educational and consulting services. Physicians and other healthcare providers refer patients to these health promotion clinics.

The Nurse Practitioner In Rural Settings

Many rural settings have difficulty supporting or attracting physicians. The 1977 Rural Health Clinic Act enables NPs to be reimbursed under Medicare and Medicaid for the services they provide in certified rural health clinics. The bill provides for direct third-party reimbursement for NP services in underserved areas, without the need for an accompanying physician's signature. Nurse practitioners in these areas take on the role of the old family physician, making house calls and looking after the general health care of the community.

The Nurse Midwife

Nurse-midwifery is not a new specialty. The first school opened in 1931, and today, nurse-midwife practice is legal in every state. A nurse-midwife is a specialist in maternal and child health. These specialists practice in hospitals, birth centers,

HMOs, public health departments, private practices, and clinics. They handle normal, uncomplicated pregnancies and care of the newborn, provide gynecological checkups, physical examinations, pap tests, and breast examinations. The nurse midwife teaches childbirth education classes, provides nutrition and sex counselling, gives advice on contraception, and makes referrals when needed.

The Nurse Anesthetist

A certified nurse anesthetist (CRNA) is an RN who has successfully completed additional education, passed a certification examination, and has been approved by the Council on Certification of Nurse Anesthetists to administer anesthesia. More than 50 percent of an estimated 20 million anesthetics given in the US each year are administered by nurse anesthetists.

In addition to working in the operating room, CRNAs may practice in psychiatric wards, emergency rooms, and intensive care areas of a hospital or may be employed by dentists, podiatrists, or plastic surgeons, or work in ambulatory surgical centers, HMOs, and other alternative care facilities.

Professional Nursing Organizations

American Nurses' Association

The American Nurses' Association (ANA) is the largest national professional nursing organization, made up of constituent state nurses' associations that have individual nurses as members. In many hospitals, the state nurses' association is the collective bargaining agent. Hence, labor and employment conditions for nursing are priorities for the organization. ANA, through its councils and cabinets, also sets standards for nursing care and continuing education, certifies nurses in clinical specialty areas and promotes nursing research. The ANA has a political action committee that raises nearly \$400,000 annually for congressional candidates, monitors legislative action, and participates in lobbying activities.

The National League for Nursing (NLN)

The National League for Nursing (NLN) is a non-profit coalition that promotes quality nursing care to the public, and is the accreditation agency for RN schools of nursing, LPN schools, community health and home care programs. NLN's individual members include nurses, educators, administrators, and other health care professionals, as well as consumers. Individual memberships totals 18,000. Its agency membership includes 1,800 nursing education programs, home care and community health agencies, and nursing departments in hospitals and related facilities.

Recognized by the US Department of Education and by the Council on Post-secondary Accreditation as the national accrediting agency for baccalaureate and higher degree, associate degree, diploma and practical nursing education (LPN), the NLN currently accredits over 1,400 educational programs. It also sponsors an accreditation program for community health and home care programs which assure consumers that an agency meets national standards and responds to the health needs of the community.

The NLN has extensive publishing, continuing education, and consultation programs, and is a major provider of testing services for the nursing community. A primary source of statistical data on nursing education, manpower, and trends, the NLN conducts several annual surveys that are widely utilized by the nursing community, the government, health planning agencies, and the media.

Specialty Organizations

There are more than 60 national specialty nursing organizations ranging from the American Academy of Ambulatory Nursing Administration, the American Assembly for Men in Nursing, the American Society of Plastic and Reconstructive Surgical Nurses, through the Emergency Nurses Association, the National Association for Health Care Recruitment, and Nurse Consultants Association. In addition to their own meetings, these organizations meet twice a year as the Federation of Nursing Specialty Organizations.

Chapter 2

Educating the Nurse

Nursing Education in Schools

In the early 1900s and through the first half of the 20th century, the nursing education model was dominated by hospital-based diploma programs. In 1949, nearly 87 percent of nursing education programs were based in hospital schools and only 13 percent in collegiate schools (BSN). The three-year program was largely apprenticeship training that provided both service to the hospital and training for students.

During World War II, a serious shortage of nurses affected both the home front and the war efforts. Nursing programs accelerated, and class enrollments increased. After the war, community colleges began to proliferate to meet the needs of servicemen and women returning to civilian life. In 1952, the associate degree in nursing (ADN) program was initiated to test the possibility of preparing nurses in a two-year program. It was felt that by removing nursing education from its service orientation, the training time required could be reduced. In 1952, two ADN programs were in existence, by 1969 there were over 400, and by 1985 there were 776 ADN programs. The ADN education has emerged as the predominant model for the education of the basic registered nurse.

The four-year, baccalaureate programs (BSN), first established in 1909, expanded rapidly in the 1960s. This program prepares nurses for leadership, with a foundation in general education.

NCLEX - Nursing Licensure Examination

Each level of education prepares the graduate for the RN licensing examination that results in an RN (Registered Nurse) status. The two-day NCLEX-RN exam consists of 372 multiple-choice questions and is given twice a year in February and July in each state. The examinations are developed and administered by the National Council of State Boards of Nursing and are known as NCLEX (National Council Licensure Examination). A uniform examination is administered at each site across the nation to allow nurses to obtain a license in another state without retaking the examination. Once the candidate passes the examination, he or she enjoys the rights, privileges, and responsibilities of a licensed RN. Most states require registered nurses to renew their licenses annually, biennially, or in some cases every three years.

Nursing School Accreditation

One of the requirements for licensure application includes graduation from an approved or accredited nursing program. The majority of nursing schools voluntarily submit to evaluation of their programs by the National League for Nursing (NLN). Accreditation of a nursing program by the NLN is a stamp of approval by the nursing community and can be important in recruiting students.

Undergraduate Nursing Programs

There are three very different nursing programs that prepare the undergraduate student for licensure examination and for nursing practice: the three-year hospital-based diploma program, the two-year community college-based associate degree program, and the four-year college or university-based baccalaureate program.

Table2.1: Basic RN Programs

	1976	1985	1988
Diploma programs	390	256	209
ADN programs	632	776	789
BSN (Inc. BRN)	336	441	623
Total	1358	1473	1621

Source: Nursing Data Review 1988, NLN Division of Research, 1989

The majority of these basic nursing preparation programs can be found in the South, with the lowest percentage in the West. Marketing planners who assume that there are too few schools in the south, or that the schools in the south have too little to spend on technology, or have a lack of interest in technology, are missing a rather sizable and interested market.

Table 2.2: Locations of BASIC RN Programs

Region	# of Programs
North Atlantic	24.2%
South	32.8%
Midwest	28.9%
West	14.0%

Source: Nursing Data Review 1988, NLN Division of Research, 1989.

The Diploma Program

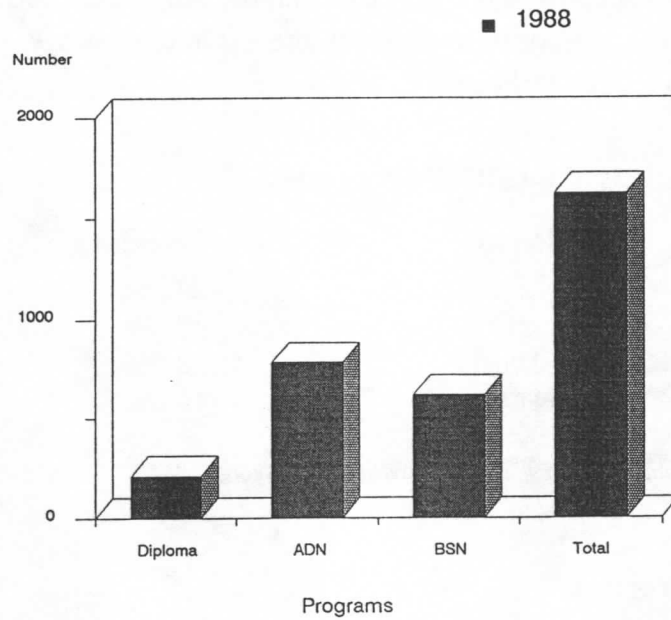
The hospital-based diploma school is a hospital-apprenticeship program. The typical program of study extends over three calendar or academic years. As the diploma student advances through the program, less time is spent in the classroom and more time is spent in clinical practice.

Upon completion, the student is prepared to take the RN licensure examination (NCLEX) and is awarded a diploma in nursing. Because of their breadth of clinical experience, graduates are readily employed in all hospital staff positions, but are not qualified for certain positions outside the hospital.

Decline in Number of Diploma Schools

The number of diploma schools has been declining precipitously over the last twenty years. The decline has been attributed to the emphasis on collegiate preparation. The role of the nurse today, it is argued, requires the addition of many more skills than the technically-oriented skills taught in these apprentice-type schools. Also, the potential nursing student looks at the time commitment of three years in a diploma school versus a two-year education leading to an ADN degree. Both programs prepare the student for credentialing and employment in the hospital setting.

Graph 2.1: Basic RN Programs



Graph 2.2: Locations of Basic RN Programs

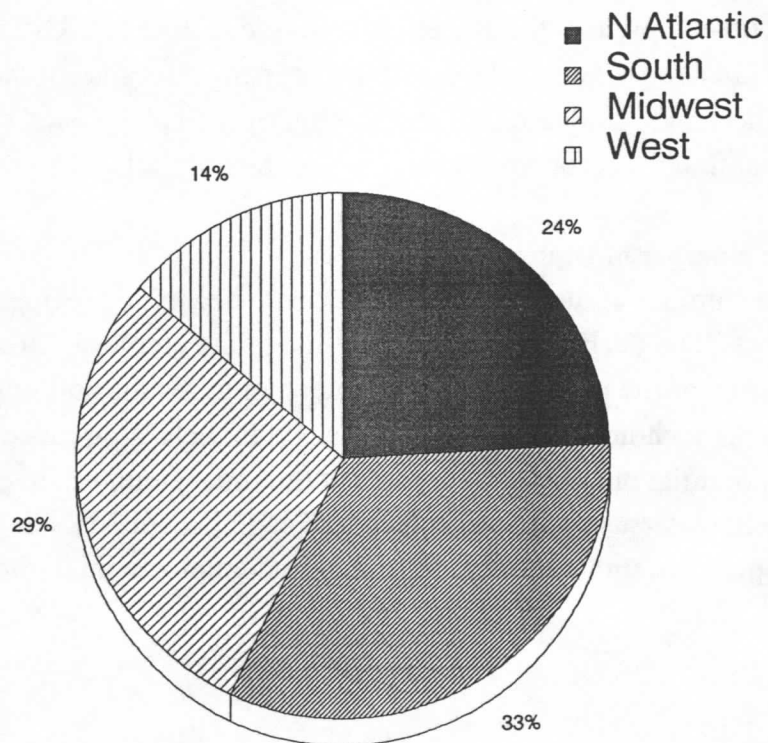


Table 2.3: Decline of Diploma and Growth of ADN and BSN programs

	1967	1972	1982	1986	1988
Diploma programs	759	540	288	238	209
ADN programs	276	532	742	776	789
BSN programs*	219	290	402	455	467
Totals	1254	1362	1432	1469	1465

* does not include BRN completion programs

Source: *Nursing Data Review 1988, NLN Division of Research, 1989.*

Underpaid Faculty

In diploma schools, fewer faculty have advanced degrees, and their salaries are considerably lower than those in ADN and BSN schools. The maximum that can be earned by a doctorally prepared instructor in a diploma program is 47 percent less than the maximum earned by a similarly prepared professor in a BSN program, and it is 35 percent less than what is earned by an ADN professor with the same credentials. As a result, many faculty are leaving diploma schools in search of better pay. In addition, low salaries may contribute to the reluctance among faculty to spend large sums of money on computer technology.

Teaching Activities of Diploma Faculty

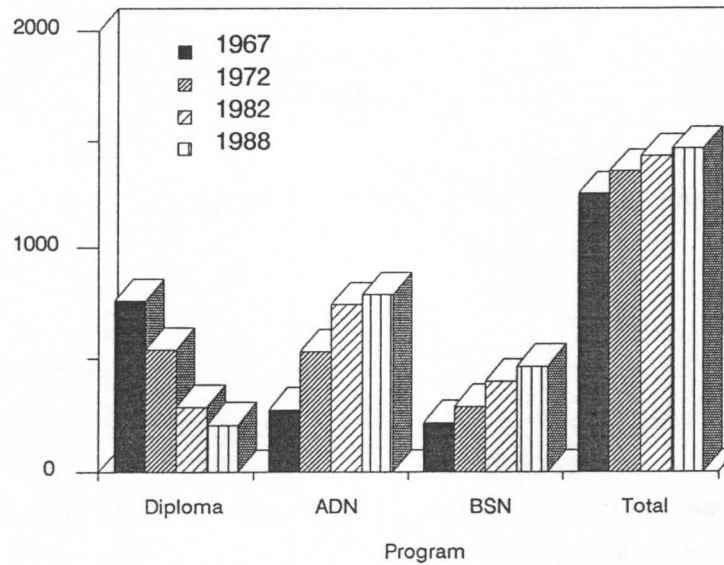
Because of the intense focus on clinical experience in the diploma program, it is not surprising that more than half (52.3 percent) of a diploma instructor's time is spent in clinical teaching. This activity includes supervision of and consultation with students who care for patients in the school's clinical facility.

Table 2.4: National average of weekly hours spent by diploma school faculty, 1987

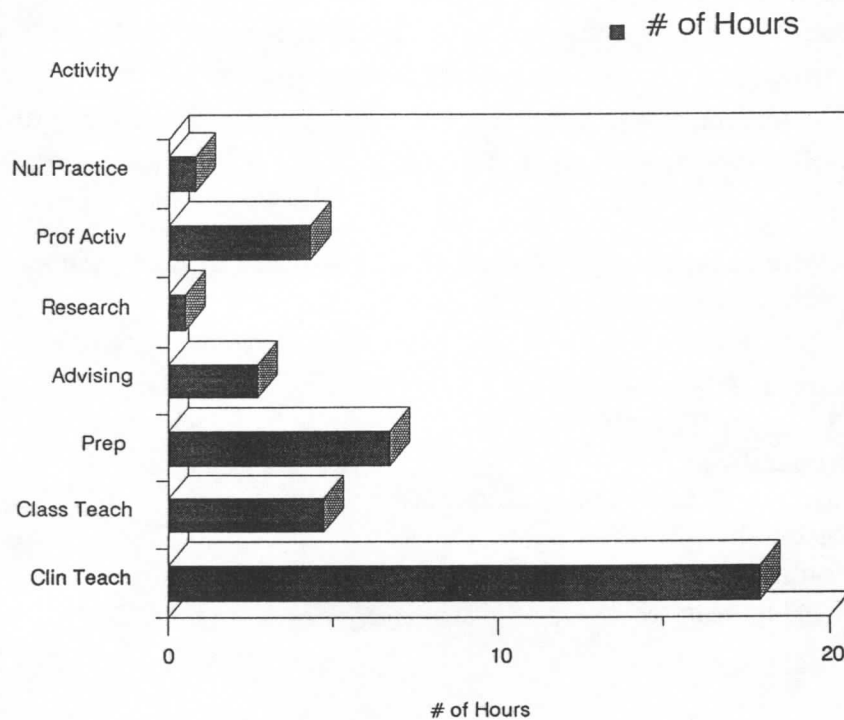
Activity	# of Hours per week
Clinical Teaching	17.9
Classroom Teaching	4.7
Preparation	6.7
Advising & Counselling students	2.7
Research	0.5
Committees & Professional Activities	4.3
Nursing practice	0.8
Total hours	37.6

Source: *Nursing Data Review 1987, NLN Division of Research, 1988.*

Graph 2.3: Decline of Diploma and Growth of ADN and BSN Programs



Graph 2.4: National Average of Weekly Hours Spent by Diploma School Faculty, 1987



Need for Computerized Materials

Because of the ready access to patients for students' clinical experiences, these faculty would be less eager than ADN and BSN faculty to supplement these experiences with interactive videodisc patient care simulations. However, the interest in tutorials may increase to supplement the diminishing number of faculty. In 1988, the NLN reported a jump in unfilled diploma faculty positions of 31.3 percent over 1986. While each diploma school employed an average of 14.2 faculty for clinical and classroom teaching in 1986, because of the exodus of faculty between 1986 and 1988, the average number of employed faculty in each school was reduced to 12.5 in 1988. With fewer faculty available, computerized tutorials to supplement classroom teaching may become a sought-after solution.

Diploma School Graduates

Hospitals readily employ diploma school graduates because their clinical nursing skills are highly developed. Unlike many of the graduates of ADN and BSN schools, diploma school graduates are not faced with the "reality shock" so well described by Marlene Kramer in her book of the same title. The diploma graduate has spent his or her last year in school moving closer to the role of a staff nurse, resulting in little difference between the diploma student's last week of school and first week on the job in a hospital. Graduates of college-oriented schools, on the other hand, have spent considerably less time in clinical training and have never actually performed the role of a staff nurse in a hospital setting.

The Associate Degree in Nursing Program (ADN)

Associate degree programs, offered in junior or community colleges and vocational-technical schools, provide two academic or calendar years of liberal and technical nursing education courses. Entrance requirements include high school graduation, and some programs require college preparation courses such as anatomy, physiology, and chemistry.

Because the pre-requisite anatomy and physiology courses are designed as general education courses, nursing faculty have requested information about the availability of CAI programs that review anatomy and physiology in the context of nursing applications. Since there is little time in these curricula for essential nursing courses, faculty are seeking independent study methods for reviewing anatomy and physiology as they relate to nursing.

Number and Location of ADN Programs

In 1988, the highest percentage of the 789 ADN programs were located in the South.

Table 2.5: Number and Location of ADN programs, 1989

	# of programs	Percentage
North Atlantic	147	18.6%
South	284	36.0%
Midwest	209	26.5%
West	149	18.9%
TOTAL	789	100.0%

Source: Nursing Data Review 1987, NLN Division of Research, 1988.

The Curriculum

Throughout the curriculum are courses in English, basic science, and nursing courses. The clinical content in the ADN school is empirical and focuses on nursing skills and facts as they relate to nursing practice. Upon completion of the program, the student is prepared to take the RN licensure exam (NCLEX) and receives an associate degree in nursing (ADN).

Need for Patient Care Simulations. Students usually are assigned to clinical practice experiences in hospitals and extended care facilities one or two days per week, averaging 16 days per semester. Because few days are allotted to clinical experience, any circumstance that diminishes opportunities for direct patient care reduces essential learning experiences for these students. As a supplement, simulated experiences could be a welcome solution for ADN faculty.

High Faculty: Student Ratio. In addition, ADN faculty supervise an average of ten students in the clinical area. With the increased acuity of patients in hospitals today, many faculty believe safe patient care is jeopardized because little time can be spent with each student. Reduction of the clinical student load with the addition of computerized simulations could improve students' clinical experience and enhance patient safety.

ADN School Enrollments

The number of ADN schools and their enrollments grew rapidly in the late 1970s and early 1980s, undoubtedly due to the increasing numbers of applicants who wanted to earn the credentials quickly. Beginning in 1985, however, enrollments decreased, reflecting not only the diminishing pool of high school graduates, but also the emerging opportunities for women in other higher paying professional career fields.

Table 2.6: Numbers of ADN Programs and Enrollments, 1967-1987

	# of Programs	# of Enrollments
1967	276	20,660
1977	645	91,102
1980	697	94,060
1983	764	109,605
1985	776	96,756
1986	776	89,469
1987	789	90,399

Source: Nursing Data Review 1988, NLN Division of Research, 1989.

ADN Faculty and Administrators

Among the many RNs returning to school today for advanced degrees are the faculty and administrators of schools of nursing. The push for more highly educated faculty in recent years has caused ADN faculty to return to school for master's degrees.

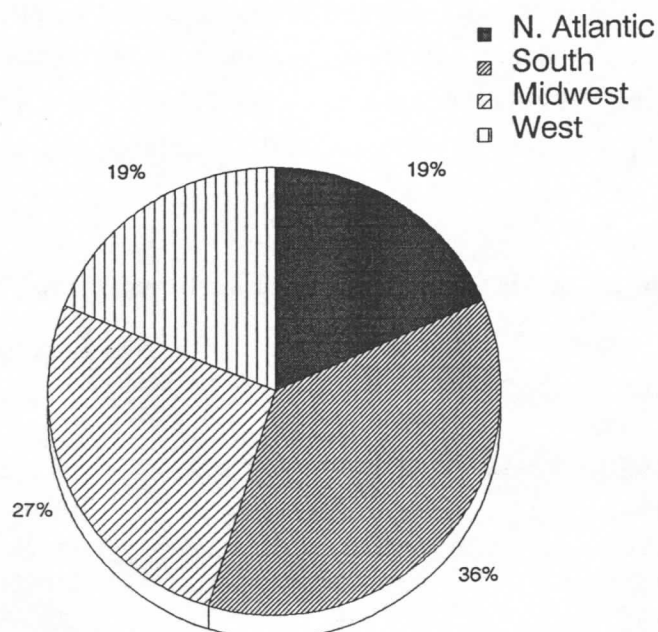
Academic Credentials

Table 2.7: Highest Earned Degree of ADN Full-time Faculty, 1986 and 1988

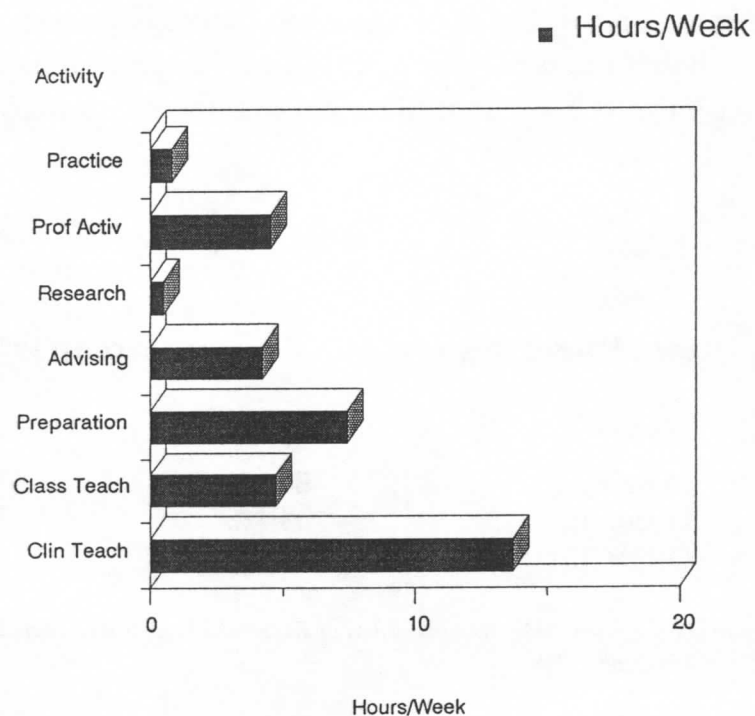
	1986	1988
Master's	80.1%	83.8%
Doctorate	3.4%	3.6%
Other (Inc. BSN)	16.5%	12.6%

Source: Nursing Data Review 1987, NLN Division of Research, 1988 and Nursing Data Review 1988, NLN Division of Research, 1988

Graph 2.5: Number and Location of ADN Programs, 1989



Graph 2.10: National Average of Weekly Hours Spent by Full-time ADN Faculty



Faculty Salaries

While the mean salaries of ADN faculty equate with diploma school faculty, ADN school administrators are paid on the average 10 percent less than diploma administrators – which explains why they too may hesitate to purchase expensive technology.

Table 2.8: National Mean of Full-Time Faculty Salaries (Calendar year*) in ADN Programs by Highest Credential, 1986 and 1988

	Mean 1986	Mean 1988
Instructor		
Master's**	\$24,759	30,900
Doctorate	29,360	30,900
Assistant Professor		
Master's**	25,279	27,700
Doctorate	30,150	28,900
Associate Professor		
Master's**	29,035	25,100
Doctorate	31,513	35,400
Professor		
Master's**	32,366	35,300
Doctorate	37,154	38,000
Chief Administrators		
Master's**	35,288	38,600
Doctorate	39,314	45,100

* Calendar year salaries are greater than Academic year salaries

** Master's in Nursing

Source: *Nursing Data Review 1987, NLN Division of Research, 1988 and Nursing Data Review 1988, NLN Division of Research, 1989.*

Unprecedented Number of Unfilled Positions, 1988

There has been little increase in salaries of these faculty between 1986 and 1988. The relatively poor rates of compensation at all levels, the cost of earning a master's and a doctorate, plus the lure of higher salaries paid by hospitals as a result of the nursing shortage, may explain the unprecedented increase in unfilled ADN faculty positions of 45.7 percent over 1986. Whereas the increased demand for faculty to staff the thirteen new ADN programs that have opened since 1986 accounts for some of the vacancies, the exodus of faculty may explain a large portion of these vacancies.

Increasing Part-Time Faculty

While the number of full-time faculty in ADN programs has declined, part-time faculty employment has increased. The increasing employment of ADN faculty parallels the increasing enrollment in these schools. One of the advantages of using part-time faculty is greater flexibility in adjusting to fluctuating enrollments. They usually are not tenured, and their continued appointment is based on student enrollments, often semester by semester.

Table 2.9: Increasing Percentage of Part-Time ADN Faculty

Year	# Full-Time Faculty	# Part-Time Faculty	% That Are Part-Time
1986	7,153	2,725	38%
1988	6,566	2,790	42%

Source: Nursing Data Review, 1988, NLN Division of Research, 1989.

The employment of part-time faculty not only fills vacancies, but part-time faculty are less costly. Part-time faculty do not receive fringe benefits, nor are they paid for such faculty responsibilities as counselling and committee work. However, because part-time faculty are not as involved with curriculum development and other planning activities, and because they tend to do their teaching and leave, they may be less interested in subscribing to new methods of teaching and learning.

Faculty Activities

ADN faculty are responsible for the development, implementation, and evaluation of the curriculum, development of standards for admission, progression, and graduation of students, academic guidance and counselling, and participation in professional activities.

Table 2.10: National Average of Weekly Hours Spent by Full-Time ADN Faculty

Activity	# of Hours per week
Clinical Teaching	13.7
Classroom Teaching	4.7
Preparation	7.4
Advising & Counselling students	4.2
Research	0.5
Committees & Professional Activities	4.5
Nursing Practice	0.8
Total hours	35.8

Source: Nursing Data Review 1987, NLN Division of Research, 1988.

The ADN Graduate

Upon entry into practice, ADN graduates are prepared to manage the care of a small group of patients in structured settings, with common, well-defined health problems, to supervise ancillary workers, and to give bedside care to patients with common recurrent health problems. The ADN program does not prepare nurses for leadership or administrative roles or for positions in community health nursing.

The Baccalaureate in Nursing Program (BSN)

The four-year baccalaureate program combines a general education with nursing courses that focus on nursing theory, community health, and research. Students may be admitted directly after high school graduation, after two years of general education or liberal arts courses, after graduation from an ADN, diploma, or LVN/LPN program with several years of active practice, or after graduation in a different major.

BSN Programs

The South not only leads the nation in the number of ADN programs available, but in the number of BSN programs as well.

Table 2.11: Number and Location of BSN programs, 1988

Region	# of programs	Percentage
North Atlantic	110	23.5%
South	158	33.8%
Midwest	144	30.8%
West	55	11.8%
Totals	467*	100%

* Does not include BRN programs

Source: *Nursing Data Review 1988, NLN Division of Research, 1989.*

The Curriculum

The BSN curriculum emphasizes the development of critical thinking, decision-making, and independent judgment, skills in leadership and management, the research process and its contribution to nursing practice, and community health nursing. In the first two years, the focus is on general education courses offered by the college or university. Clinical experiences begin during the second year when students care for patients with minimal nursing care needs in areas of health promotion

and rehabilitation. The senior year focus is on community health problems, leadership, and management.

Need for Patient Care Simulations. Clinical nursing courses and experiences are provided in medical-surgical nursing, public health agencies, and community facilities. In most schools, students care for one to three patients for eight to twelve hours a week. As in the ADN programs, anything that precludes the types and numbers of patient care experiences, can be detrimental to the complete preparation of the nursing graduate.

Four Types of BSN Programs

There are four distinct types of nursing programs that offer a BSN (Baccalaureate in Nursing) degree - a generic program, external degree program, the BRN or RN completion program, and an accelerated program for non-nursing graduates.

Generic. The so-called generic program is the traditional, basic four-year curriculum, a highly structured four-year academic program designed to accommodate the high-school graduate.

External Degree. External degree programs, administered by colleges or universities, allow students to complete their studies away from the campus - at external settings. This is a part-time program specifically designed for students who do not have the time or money to engage in conventional, full-time study. Students earn degrees by completing equivalency tests. Nursing skills are learned through on-the-job training followed by an intensive practical examination. One of these programs, the California Statewide Nursing Program, developed CAI and interactive videodisc programs for use by its students. Students in these programs may be high school graduates or RNs returning for a baccalaureate degree.

BRN. The baccalaureate program for the RN, or RN completion programs, usually is offered in colleges or universities and is designed specifically for the returning RN. Some offer advanced placement by exam. The usual length of these articulated programs is two years of full-time or three years of part-time study. The BRN adds research, community health, nursing theory, and nursing management principles to the basic nursing education.

Accelerated Program. A fourth type of program is designed specifically for a graduate holding a degree in a major other than nursing. These non-nursing students may have been working in their field for a number of years and then chose to become nurses. The total length of the program is shorter than the usual four years,

accelerated by acceptance of general education courses, by collapsing the content, and by expanding time outside the classroom to complete the course work.

Growth in BSN Schools of Nursing

There has been a steady growth in the number of BSN programs. While they are still outnumbered by the ADN programs, the margin of difference is shrinking rapidly. The growth is due to the growing numbers of RNs having received their basic education in diploma and ADN schools and are now returning to earn a baccalaureate degree.

Table 2.12: Growth in the Number of BSN Programs

	1982	1983	1984	1985	1986	1988
Generic BSN programs	402	421	427	441	455	467
BRN programs	15	28	108	161	161	156
Total BSN programs	417	449	549	602	616	623

Source: Nursing Data Review 1988, NLN Division of Research, 1989.

BSN Students

Today's BSN student enrollment is much different than it was in 1977. While slowly decreasing from a high of 102,000 generic students in 1977, the increasing number of RNs enrolled in both generic programs and the recently established BRN programs has reversed an overall decline in BSN enrollment. In 1987, the RN student enrollment represented 39 percent of the total number of BSN students.

Table 2.13: Students Enrolled in BSN Programs

	1982	1985	1986	1987
Generic BSN	94,363	91,020	81,602	73,621
RNs in Generic programs	20,933	22,812	25,247	26,503
RNs in BRN programs	14,729	20,128	21,108	19,872
Totals	130,025	133,960	127,957	119,996

Source: Nursing Data Review 1987, NLN Division of Research, 1988.

BSN as Level of Entry Into Practice

The cause of this massive return is the increasing evidence that the basic level of entry for a professional nurse will be the baccalaureate degree. When the BSN education becomes the level of entry, graduates of ADN and diploma programs will be known as technical rather than professional nurses. Although both nursing organizations (the NLN and the ANA) have said that all diploma and ADN educated nurses will be grandfathered in as professional nurses, many RNs want to achieve this status by earning it.

BSN as Prerequisite to Advanced Degrees

Many RNs are seeking the BSN because it is a prerequisite to higher degrees. With the push for advanced degree requirements for nurses employed as professors, nursing administrators, and executives, and with the desirability of moving into expanded roles such as clinical specialists and nurse practitioners, the BSN is a first step.

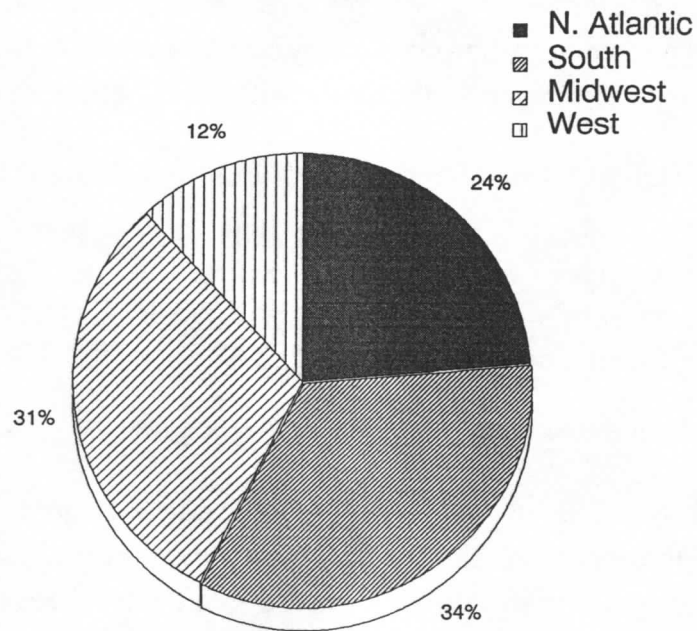
Changing Characteristics of the BSN Student

Because of the rising majority of RNs enrolled in BSN programs, the characteristics of the student population have changed. BSN programs, once structured and designed for the high-school graduate, have had to accommodate the growing number of adult RN and second-career students. The adaptation of the generic programs to the needs of this older, more experienced student, explains the decline of BRN programs, which traditionally have geared programs for the RN. It also explains the increased enrollment in generic programs. These adaptations include accommodating part-time working students, allowing credit for previous knowledge and experience by examination, and restructuring of content delivery to appeal to adult learners.

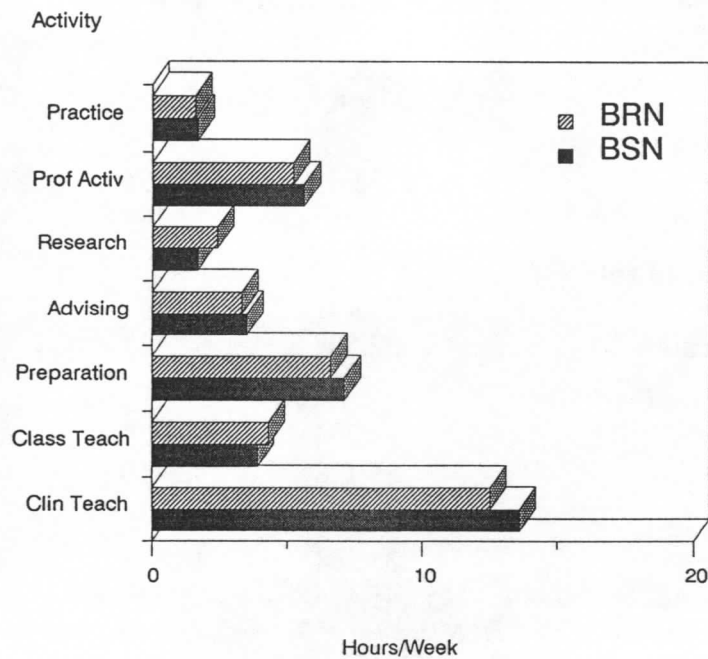
Part-time Students. In 1987, almost half of the RNs enrolled in BSN programs attended part-time (47 percent). In addition, more generic students were attending part-time (13 percent). Indeed 26 percent of the 119,996 students enrolled in BSN programs were part-time students.

Adult Learners. Because the average age of the returning RN ranges from 28 to 34, the average age of the BSN student has increased well beyond that of the high-school graduate.

Graph 2.11: Number and Location of BSN Programs, 1988



Graph 2.16: National Average of Weekly Hours Spent by Full-time BSN and BRN Faculty, 1986



BSN Faculty

Faculty in BSN programs are required to have a current RN license and a minimum of a master's degree, with some requiring faculty-members to earn a doctorate. At the same time, however, many schools require only one year of employment as a nurse, resulting in fewer faculty with much patient care experience.

Table 2.14: Highest Earned Degree of BSN Full-time Faculty, 1986, 1988

Degree	1986	1988
Master's	74.5%	66.6%
Doctorate	23.7%	32.2%
Other (inc. BSN)	1.8%	1.2%

Source: Nursing Data Review 1988, NLN Division of Research, 1989.

Status & Increased Salary as Motivator for Advanced Degree

The increases in salaries for BSN faculty over the past two years have been modest at best and certainly do not compare with the gains realized by staff nurses, who have benefitted from the shortage. BSN educators move through the ranks of instructor, assistant, associate, and then full professor and must hold an earned doctorate to be considered for tenure. Faculty are opting for advanced degrees as a means of retaining their jobs, upgrading their status, and bolstering their pay.

Table 2.15: National Mean Salaries of Full-Time Educators in BSN Programs by Highest Earned Credential, 1986-1988 (Calendar Year)

	1986 Mean	1987 Mean	1988 Mean
Instructors			
Master's	\$25,966	\$27,994	\$29,480
Doctorate	27,550	32,464	34,097
Assistant Professor			
Master's	29,441	31,441	32,917
Doctorate	32,508	37,111	38,756
Associate Professor			
Master's	34,284	37,318	39,019
Doctorate	36,128	42,410	44,852
Professor			
Master's	38,364	48,876	50,598
Doctorate	45,474	51,729	54,805

Source: Nursing Data Review 1987, NLN Division of Research, 1988 and American Association of Colleges of Nursing in their 1988 survey reported in Nursing 89, January, 1989.

Faculty With Joint Appointments

An option for those who do not wish to earn a doctorate is to hold a position as clinical professor or a joint appointment with a hospital or community agency. These educators work in the hospital or community setting, with or without nursing students and have teaching responsibilities in the college or university. Because of their expertise in current patient care practice, they can bring a fresh perspective of the "real-world" to the classroom. Additionally, because they have "a foot in both camps", these faculty can coordinate educational activities and methods between a school and a clinical facility.

Faculty Activities

Besides working with students in the classroom and the clinical areas, and preparing class materials, faculty work on various committees in the school of nursing, as well as the college or university.

Table 2.16: National Average of Weekly Hours Spent by Full-Time BSN and BRN Faculty, 1986

Activity	# of Hours per week	
	BSN	BRN
Clinical Teaching	13.6	12.5
Classroom Teaching	3.9	4.3
Preparation	7.1	6.6
Advising & Counselling students	3.5	3.3
Research	1.7	2.4
Committees & Professional Activities	5.6	5.2
Nursing Practice	1.7	1.6
Total hours	37.1	35.9

Source: Nursing Data Review 1987, NLN Division of Research, 1988.

The BSN Graduate

Graduates are prepared to take the RN licensure examination (NCLEX) and are awarded baccalaureate degrees (BSN). Upon entry into practice, these graduates are prepared to apply principles of scientific investigation and nursing theory to the assessment, treatment, and evaluation of human responses to health and illness in all areas of nursing practice, and are able to take beginning leadership positions in all healthcare settings.

Graduate Nursing Programs

Master's in Nursing (MSN)

Advanced education prepares nurses for positions as teachers, administrators, nurse practitioners, consultants, clinical specialists, and, in a new program at the University of Maryland, as Hospital Information System Specialists.

Entrance requirements vary, but they generally require a baccalaureate degree from an NLN-accredited program in nursing or its equivalent, licensure as an RN, completion of an introductory course in statistics, completion of the Graduate Record Examination (GRE), a minimum GPA of 3.0, and at least one year's recent work experience as an RN related to the selected field of specialization study.

Like the number of RNs returning for baccalaureate degrees, the number of RNs returning for master's in nursing (MSN) degrees is increasing bountifully. The escalation in the number of applicants for master's degrees has stimulated the creation of new programs. In just two year's time, between 1985 and 1987, the number of MSN programs increased by 14 percent, an addition 27 new programs.

As in the number of ADN and BSN programs, the South has the predominantly larger number of MSN programs.

Table 2.17: Growth of MSN programs 1977-1987

Region	1977	1980	1983	1987
North Atlantic	26	32	37	52
South	38	46	51	56
Midwest	31	34	40	51
West	17	23	26	35
Totals	112	135	154	194

Source: Nursing Data Review 1988, NLN Division of Research, 1989.

MSN Students. The number of part-time students enrolled in MSN programs is increasing. Because many of these students are employed in schools of nursing, hospitals, and other clinical agencies, flexible and accelerated learning methods are essential for these part-time students.

Table 2.18: Full-Time and Part-time Students Enrolled in Master's in Nursing Programs, 1967-1986

Year	Total Enrolled	# Enrolled Full-time	# Enrolled Part-time	Part-time % of Total Enrollments
1967	3,531	2,751	780	22.0%
1977	12,143	6,108	6,035	49.6%
1986	19,958	5,668	14,290	71.6%
1987	21,195	6,113	15,082	71.2%

Source: *Nursing Data Review 1988, NLN Division of Research, 1989.*

Majority Preparing for Advance Clinical Practice

The largest percentage of enrolled MSN students are pursuing a major in advanced clinical practice (64.8 percent). The advanced clinical practice major prepares nurses for practice as clinical nurse specialists or as nurse practitioners. clinical nurse specialists work predominatly in acute care settings while nurse practitioners can be found in any healthcare setting, from the hospital, to psychiatric hospitals, to rural communities, to industry, to sharing a practice in a physician's office or to having a practice in their own office.

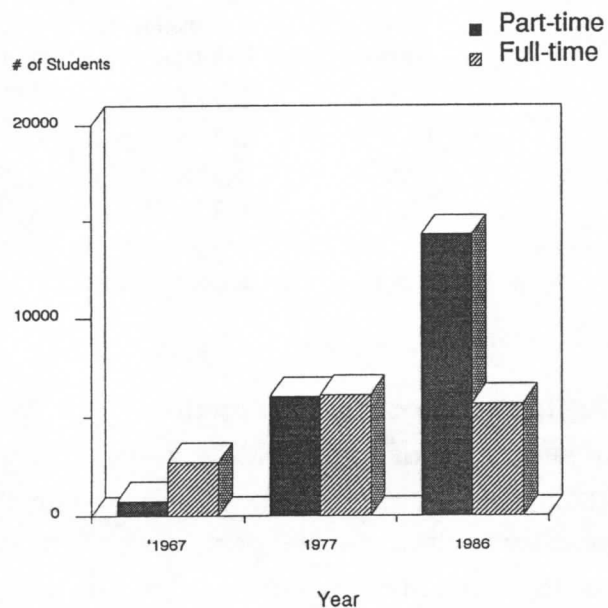
Table 2.19. Major Area of Study of MSN Students in 1987

Area	Number	Percent
Advanced Clinical Practice	13,735	64.8%
Administration/Management	4,487	21.2%
Teaching	2,928	13.8%
Other	45	0.2%
Total	21,195	100%

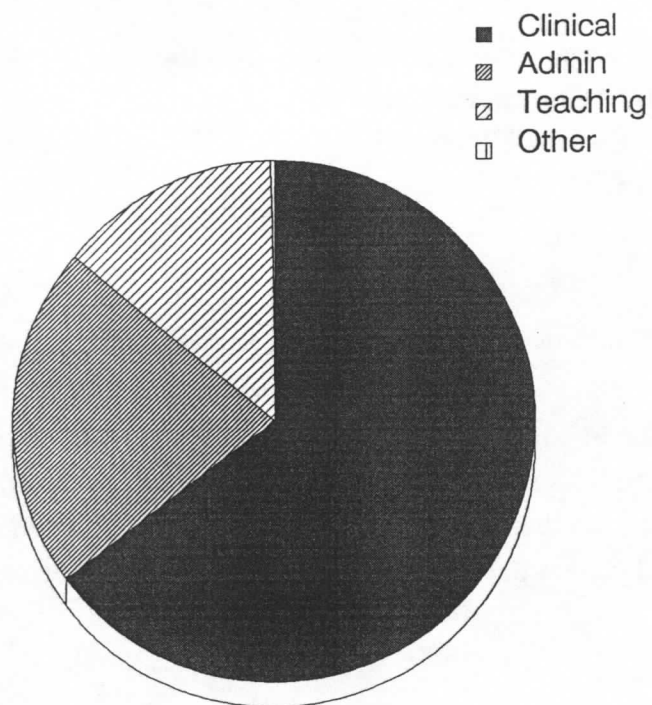
Source: *Nursing Data Review 1988, NLN Division of Research, 1989.*

Need for Flexible, Accelerated Learning Methods. Because the majority of the students are RNs removed from full-time clinical practice, methods must be found to accelerate their learning and return them to full-time practice. Since 72 percent attend classes part-time, flexibility in learning alternatives could hasten this process.

Graph 2.18: Full-time and Part-time Students Enrolled in Master's in Nursing Programs, 1967-1986



Graph 2.19: Major Area of Study of MSN Students, 1987



Curriculum. Completion of the program usually requires five to six quarters, or two academic years. The curriculum must include advanced knowledge and skills in scientific inquiry, the validation and application of research findings in practice, and nursing theory and its application to a specialized area of nursing.

Courses are required in the selected nursing specialty, in addition to courses in research and research critique, electives from a discipline other than nursing, and a clinical residency for advanced practice. Candidates also also required to write a comprehensive exam or a thesis.

Number of RNs With Advanced Degrees

In 1988, 55,000 nurses held master's degrees in nursing and 4,100 nurses held doctoral degrees. While the majority were PhDs (Doctor of Philosophy) in a variety of disciplines, or EdDs (Doctor of Education), many were doctorates in nursing (DScN).

Doctorate in Nursing Science (DNSc)

Most DNSc programs require four to five years to complete. Students must complete a research study that will make a major contribution to nursing literature and to clinical nursing practice.

The South pulled ahead of the rest of the country in its number of available doctoral programs in 1987. Indeed the South had the largest proportion of doctoral graduates in 1987, with over 34 percent of the total.

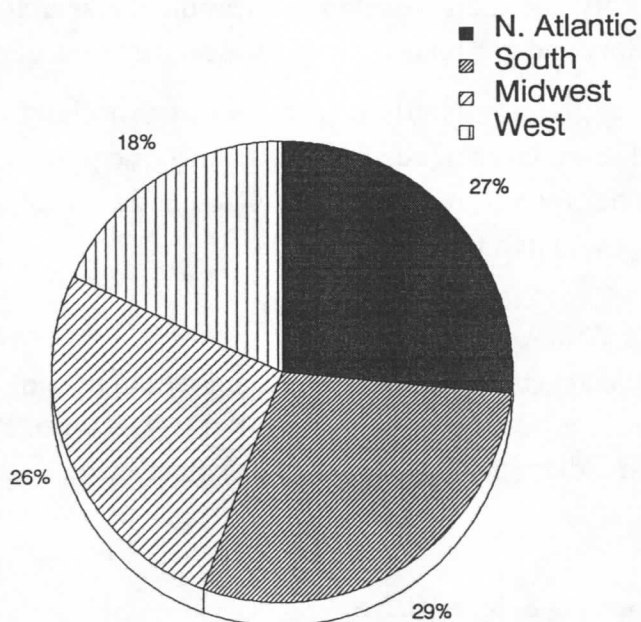
Table 2.20: Growth of Nursing Doctoral programs 1978-1987

Region	1978	1980	1985	1987
North Atlantic	7	7	10	12
South	3	4	6	14
Midwest	6	6	10	11
West	5	5	7	8
Totals	21	22	33	45

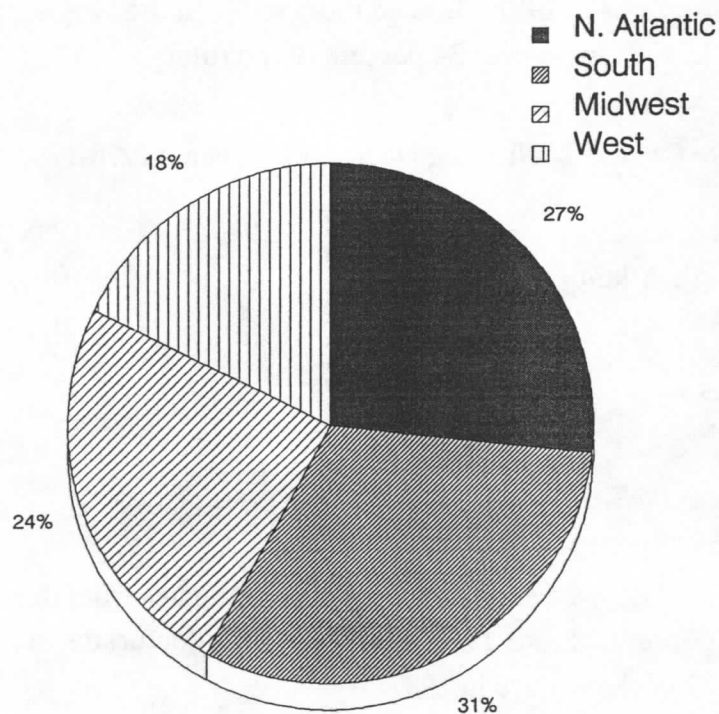
Source: Nursing Data Review 1988, NLN Division of Research, 1989.

In the last five years, the number of graduates from doctoral programs grew almost 85 percent. Since 1976, a total of 1,563 doctorates in nursing have been granted, 257 of these were in 1987.

Graph 2.17: Number and Location of MSN Programs, 1987



Graph 2.20: Location of Doctoral Programs, 1987



The DNSc Graduate. Nurses are prepared at the doctoral level for roles as nursing school faculty, directors, and deans. The faculty at the college and university levels today, frequently are required to earn doctorate degrees to keep their jobs. Doctorally prepared nurses are found increasingly in hospital settings as administrators, researchers, and quality assurance experts.

Continuing Education for All RNs

Continuing Education for Licensure Renewal

Nursing is not a static profession. Methods, medications, technology, procedures, and scientific information are changing constantly. To insure that licensed RNs are up-to-date, 14 states require continuing education for license renewal. The mandatory requirement for continuing education in nursing is measured in contact hours or in continuing education units (CEUs). One contact hour equals 50 minutes in an approved, organized learning experience.

CEU Providers

Since the early 1920s, many colleges and universities have provided conferences and workshops for nurses. The number of these educational offerings have increased steadily in the last decade, accelerated by the state mandates for license renewal. Continuing education is offered by colleges, hospitals, voluntary agencies, private proprietary groups, professional journals, and college extensions, and has become a source of income for each of these providers.

Not just any educational program can award continuing education units (CEUs). Approval of these continuing education programs for re-licensure is obtained through each state's board of nursing. An educational program is approved by these boards after examining the credentials of the instructor, the program's content, and its relevance to nursing practice. Upon approval, providers are granted a provider number and are required to keep records of the continuing education units they have granted.

Types of Continuing Education Programs

Continuing education programs can be as short as one hour or as long as one semester. Community colleges, for example, offer intensive two-week courses or semester-long courses preparing nurses for critical care unit, coronary care unit nursing, or Lamaze Teacher Certification.

Topics of Continuing Education Programs

Colleges, universities, large medical centers, and private educational organizations offer a wide array of year-round continuing education programs that address timeless and ongoing topics of interest to nurses, as well as new problems and developments that infiltrate the nursing practice. Timeless topics include legal responsibilities, trauma, neurological problems, clinical performance evaluation, stress management, emergency nursing, patient care planning, cancer nursing, drug and alcohol dependence, EKG interpretation, and physical assessment. Examples of new topics include AIDS, case management, gerontology, computerized information systems, care of patients with transplants, nutrition and eating disorders, budgeting, strategic planning, principles of management, and starting nurse-owned businesses.

Prices of CE Courses

The cost of continuing education courses range from \$40 to \$200 each. All of the programs provide certificates of attendance, and many grant CEUs on the basis of whether the participants come from states requiring continuing education.

Paid for By Nurses. Most continuing education programs are paid for by nurses themselves. As a recruitment and retention benefit, a growing number of hospitals grant sufficient paid time off to achieve the CEU credits required by their state. Few institutions reimburse nurses for tuition or fees, and it is rare that a hospital will pick up the tab for travel expenses. Even prior to DRG implementation in 1977, when many hospitals were economically flush, only 22 percent of hospitals paid for tuition and travel. Nursing schools' budgets for faculty continuing education is sparse at best. Several ADN faculty report that their continuing education stipend totals \$200 per year.

Loss of Tax-Deduction. The number of attendees at conferences and seminars has diminished considerably since the new tax laws went into effect. Before a tax deduction for continuing education is possible today, a nurse must spend more than two percent of gross income on professional expenditures. With the increase in airfares and hotel accommodations, attending an out-of-town program as an income tax deduction is no longer attractive to most nurses.

Continuing Education Through Home Study

Because of the cost of travel and the difficulty of obtaining time off for continuing education, RNs are taking advantage of less-expensive home study continuing education offerings. Several nursing journals such as *American Journal of Nursing*,

RN, Nursing 89, and *Heart and Lung* (the journal of critical-care), grant CEUs for those who read specifically designated articles, take a posttest, and return it by mail.

Audio and Videotapes for CEUs

Private continuing education businesses, many established by RNs, offer self-study booklets, audiotape, or videotape programs with accompanying posttests that are returned by mail. The providers score the tests, and a CEU certificate is returned. Prices range from \$19.20 for journal offerings, \$30-\$90 for a program booklet, \$80 for an audiotape, to \$120 for a videotape.

The American Journal of Nursing Company (AJN) will rent or sell videotape programs for continuing education. Videotapes can be rented for \$80 by institutions or individual. Additional costs of \$7.00 for one contact hour and \$10.00 for two contact hours are charged for the study guide, the posttest, and for posttest scoring.

Nursing Specialty Certification

Certification of knowledge and experience in nursing practice specialties, offered by the American Nurses Association (ANA) and the American Association of Critical Care Nurses (AACN), is a step beyond licensure and requires periodic renewal. The RN licensure examination certifies minimum competence for safe nursing practice. Certification indicates that the nurse in practice has met certain predetermined standards of knowledge and skill specified for that practice specialty, and has an advanced level of competence. Renewal demonstrates continued growth in expertise and knowledge.

Types of Certification Offered by ANA

Despite the fact that few hospitals offer incentives or salary differentials for certification, the number of nurses voluntarily submitting to these examinations is increasing. For example, in 1975, the ANA offered certification examinations in three practice areas—gerontology, psychiatric-mental health, and pediatrics—and certified about 500 nurses. Today, ANA offers 19 examinations in 7 areas of nursing practice and has certified 50,000 nurses in the following specialty areas: the child and adolescent, community health, gerontology, high-risk perinatal nursing, maternal and child, psychiatric and mental health, medical-surgical nursing, nursing administration, and advanced nursing administration.

Critical Care Nurse Certification

The AACN instituted its certification program in 1975. Today, of the 194,000 critical care nurses in practice today, more than 29,000 have earned Critical Care RN (CCRN) certification status. One year of practice in critical care nursing is a pre-requisite for application for the initial examination. The first-time pass rate is 60 percent. Renewal requires a minimum of 240 hours at the bedside and 100 CERPs (Continuing Education Recognition Points) that include 25 hours of continuing education in critical care, or recertification by retaking the CCRN examination.

Other Nursing Organizations' Certification

Other nursing organizations provide certification credentials for emergency room nurses, intravenous therapy nurses, neonatal intensive care nurses, occupational health nurses, oncology nurses, and urologic nurses.

Chapter 3

An Overview of the Market

Hospital Expenditures on Education/Training

Identifying the true costs of nursing education in hospitals is difficult. While one figure may be stated in the budget, actual costs can be from five to eight times greater. Much of this discrepancy is accounted for in the salary paid to employees during on-the-job training and non-budgeted informal inservice education.

Four methods for estimating nursing education expenditures in hospitals have been identified:

- Expenditures per Registered Nurse (RN) employed
- Expenditures based on the number of occupied beds
- Percentage of total operating expenses
- Multiple of actual budgeted amount to reflect hidden costs

Baseline Figures

Harbridge House, Inc., a New York management consulting firm, in its 1984 study of nursing education expenditures, found that hospitals spent an average of \$2,400 per RN, or \$12,169 per occupied bed. The amount budgeted for education was usually four percent of total operating expenses.

Estimate Based on Cost Per RN Employed: \$1.8 Billion

Because of recent budget cuts due to changing economic conditions for hospitals, the rate of spending on nursing education may be reduced from the 1984 rate reported by Harbridge House. If the average annual expenditure per RN is \$2,000 today, the annual expenditure based on the 899,800 RNs employed in hospitals in 1988 would be \$1.8 billion

Estimate Based on Cost Per Occupied Bed: \$15.9 Billion

Based on a reduced rate of \$10,000 per occupied bed, multiplied by the 1,587,780 occupied beds reported for 1988, the annual expenditure for nursing education would be \$15.9 billion.

Estimate Based on Four Percent of Total Budget: \$5.6 Billion

According to *California Hospital Statistics* for 1986, the average total direct expense of 537 California hospitals was \$24,342,262 each. Four percent of this figure (\$974,000), multiplied by the 5,783 community hospitals in the U.S. in 1985, provides a \$5.6 billion figure for all nursing education and training.

Estimate Based on Multiple of Training Budget: \$7.8 Billion

TDS Healthcare Systems Corporation reported in 1988 that the average training department budget in a hospital was \$200,000. This would total to \$1.2 billion annually in *budgeted* expense. When the hidden costs of 5 to 8 times budget suggested by Harbridge House are added, this figure also compares favorably with the above estimates for nursing education with a figure between \$6 billion and \$9.6 billion, or an average of \$7.8 billion.

Table 3.1: Estimate of Annual Expenditure on Nursing Education

Method of Calculation	Estimate (in Billions of Dollars)
Cost Per RN	1.8
Cost Per Bed	15.9
Percent of Total Expenses	5.6
Budget Plus Hidden (avg.)	7.8
Average of all methods	7.8

Hospital Expenditures By Department

The following table demonstrates the number of hours and the costs of educational programs in one 400-bed San Diego, California hospital in 1984.

Table 3.2: Education-related Hours and Their Cost by Hospital Department in a San Diego 400-bed Hospital in 1984.

Department*	Teaching** Hours	Education Program Attendance Hours	Patient Education Hours	Total Cost
Cardiac Center	21	54	6	\$,639
Cardiac Rehab	392	5	396	69,339
Occupational Therapy	200	124	170	64,330
X-Ray/Ultrasound	60	258	20	129,116
Dietary	140	695	102	77,906
Laboratory	174	141	n/a	67,779
Medical Records	264	660	n/a	117,888
Patient/Family Services	68	348	34	61,540
Operating Room	1,451	817	42	321,437
Med-Surg Services	1,255	1,516	140	771,734
Physical Therapy	720	829	905	288,967
Pharmacy	104	118	20	56,177
Rehab Nursing	557	331	451	141,840
Woman's Pavilion	326	95	301	58,730
Emergency Room	265	356	n/a	120,122
Critical care	3,669	2,368	2,477	994,649
Pulmonary Services	427	46	157	96,999
Total				\$3,936,944

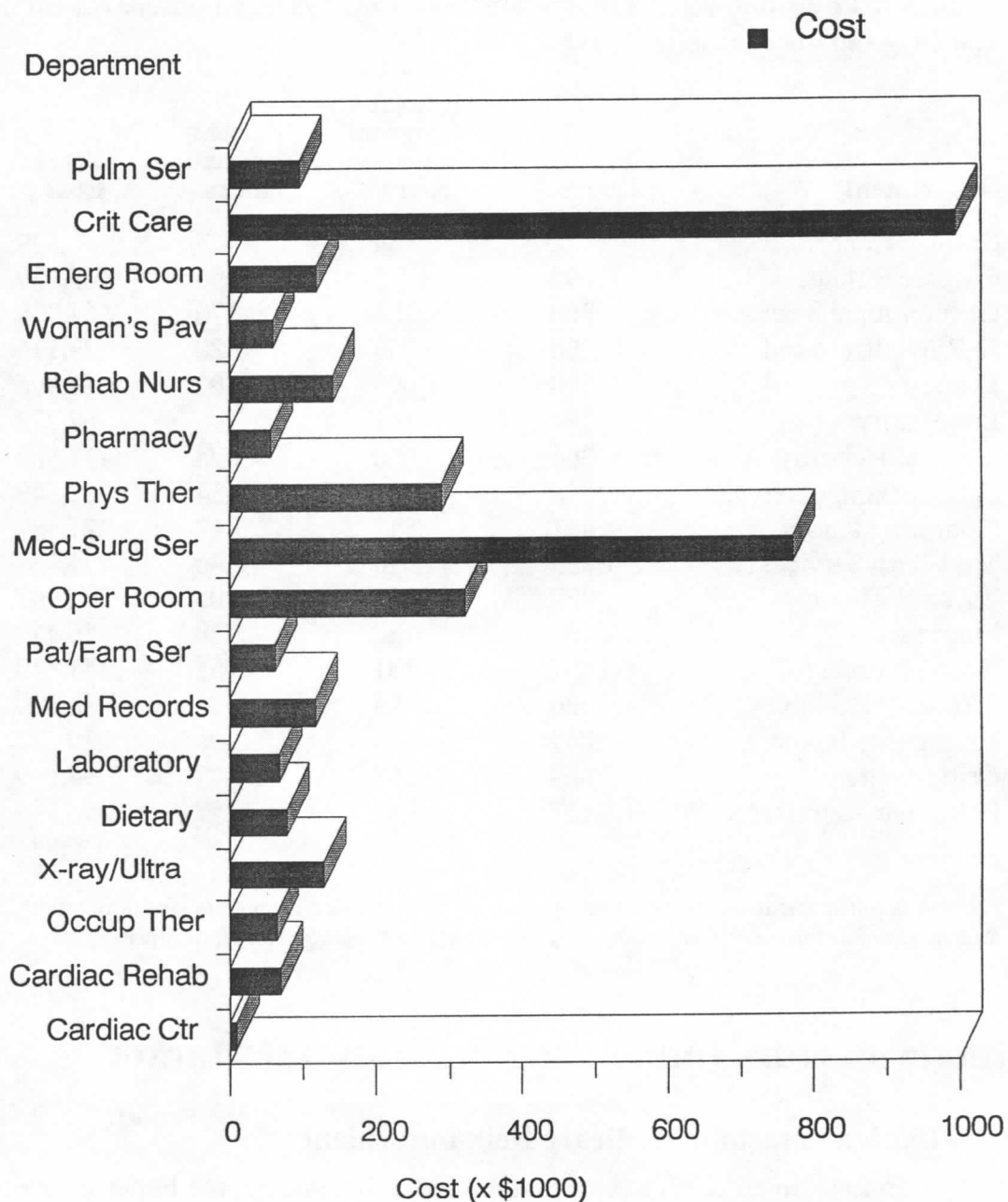
*Not all departments in original study are presented. **Includes teaching time for orientation
Source: Handouts from 1985 presentation by consultants for Harbridge House, Inc., NY.

Primary Factors Influencing the Hospital Market

DRG Implementation: Medicare Reimbursement

In 1983, in an effort to control the costs of healthcare, the Federal government instituted a prospective payment plan to reduce the cost of hospital stays for Medicare patients based on Diagnostic Related Groups (DRGs).

Graph 3.2: Education-related Costs by Department in a San Diego 400-bed Hospital, 1984



Under the old reimbursement system, expenses incurred for healthcare services deemed medically necessary were paid retrospectively by the insurer. Since healthcare expenses were paid regardless of the costs incurred, there was no incentive for better management and cost-control. By 1982, the costs of healthcare had escalated to \$322 billion, amounting to \$1,400 for every man, woman, and child in the U.S.

Under the DRG system, patients' conditions are categorized into 467 "diagnosis-related groups," and reimbursement to the hospital is paid prospectively based on the DRG of each patient admitted. The hospital is given a fixed payment for *typical services* rendered during the *average number of hospital days* required for patients with a particular diagnosis. Any costs over the amount designated by the Federal government comes out of the hospital's profits. For example, when a patient is admitted as a cardiac arrest, insurance pays for five days of hospitalization. For care of a patient admitted with an myocardial infarction (MI), 10 days are paid for — three days if the patient dies. For the MI patient who dies on day nine, the hospital is reimbursed for only three days.

DRGs Mean Fewer Patients

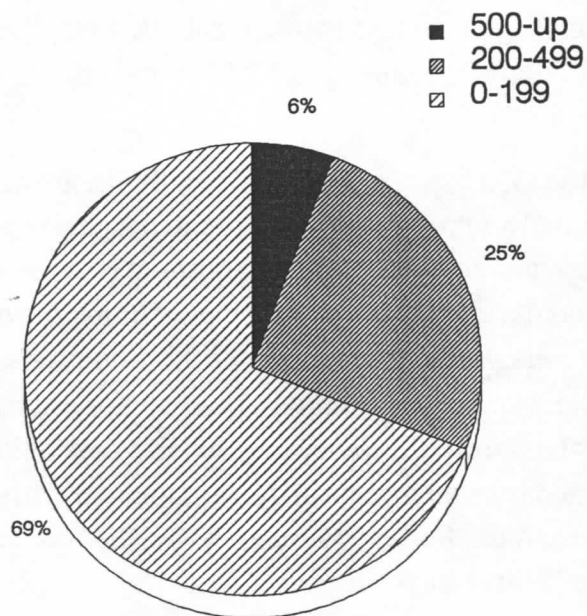
With the implementation of the DRG prospective payment system, one of the first moves made by hospitals was to shift a large number of inpatients to outpatient facilities for treatment. As a result, there was a decrease in the number of patients admitted, and the average daily census began to fall dramatically. The rapid decline in hospital census and the heavy restrictions on Medicare payment forced a number of hospitals to close. There was a total reduction of 142 hospitals between 1983 and 1985; in 1986 alone, 71 community hospitals closed their doors. Of these hospitals, more than three-fourths had fewer than 100 beds. The financial squeeze was less well tolerated by the smaller hospital.

Table 3.3: Classification of Community Hospitals By Size, 1985

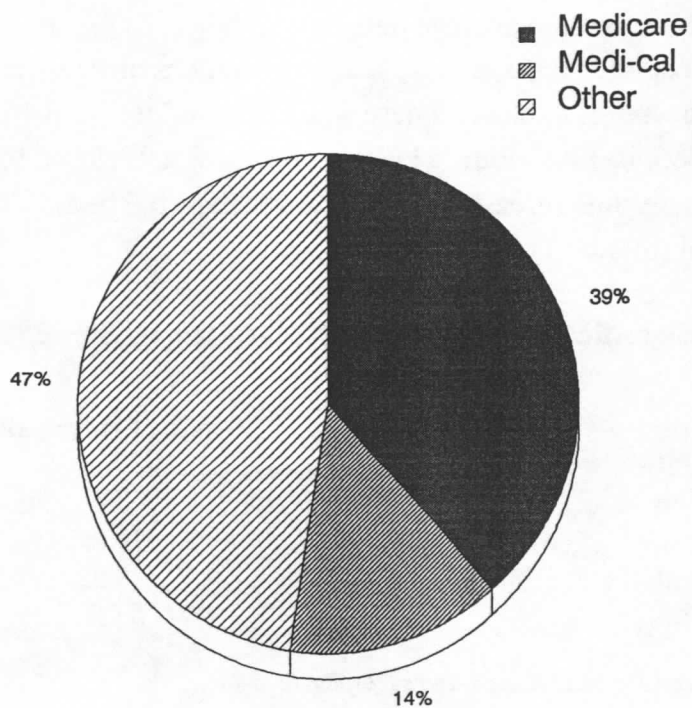
Size	No. of Beds	No. of Hospitals
Large	500-up	339
Average	200-499	1438
Small	0-199	4006
Total		5783

Source: American Hospital Association's *Hospital Statistics*, 1986.

Graph 3.3: Classification of Community Hospitals by Bed Size, 1985



Graph 3.4: Revenue Sources in 537 California Hospitals, 1984-1985



DRGs Mean More Chronically Ill Patients

To match the cost of patient care, patients now are discharged as quickly as possible. Whenever possible, patients are not admitted, but instead treated on an outpatient basis. Diagnostic work-ups and simple surgical procedures also are treated on an out-patient basis. The result is that only the sickest patients are admitted to hospitals. Those who are admitted are treated quickly and cost-effectively and discharged as early as possible.

DRGs Affect on the Hospital Budget

Because of its control over Medicare payments, the Federal government controls approximately 40 percent of all hospital revenues. In California, the state government's MediCal system adds additional control, bringing dependence on government funds to over 50 percent of hospital revenues.

Table 3.4: Revenue Sources in 537 California Hospitals, 1984-1985

Revenue Source	Medicare	Medi-Cal	Other
Gross Inpatient	35.5%	11.7%	37.4%
Gross Outpatient	3.3	2.4	9.7

Source: California Hospital Statistics, 1986.

DRGs Change the Way Hospitals are Managed

DRG payment strategies have led healthcare into an era of big business in which serious attention is paid to financial management and strategic planning to find innovative ways to cut costs and increase revenues. To improve their chances of survival, a number of hospitals banded together to share cost and reduce expenses. Today, nearly every hospital participates in some form of multi-institutional arrangement, multihospital system, alliance, or network to share services, purchasing, and teaching affiliations.

Examples of multihospitals systems today include Hospital Corporation of America (HCA) which owns 218 hospitals and contract-manages an additional 190, Humana, which owns, leases, or sponsors 82 hospitals, and Lutheran Hospitals which own, lease or sponsor 31 hospitals, and contract-manage nine. In addition, there are 87 Roman Catholic Church-related systems that control 557 hospitals. It has been predicted that healthcare eventually will be dominated by 25-50 large corporations

and that by 1990, 20 percent of all healthcare revenues for hospitals and nursing homes will be paid to these few large corporations.

Of the 5,783 community hospitals in the U.S. in 1987, 44 percent were part of multihospital systems. Multihospital systems are generally horizontally organized to combine similar healthcare delivery units and to share economic resources, and are controlled through a corporate office responsible for executive management. This type of organization creates the possibility of one sales call covering as many as 218 hospitals.

Effect of DRGs on Hospital Education Departments

Because hospital education departments are non-revenue producing, their budgets are often hardest hit when measures are taken to reduce costs. However, some savvy education departments are finding ways to produce revenue through community education programs and to reduce costs by sharing education tasks with schools and other hospitals in the community.

For example, to cut nursing education costs, critical care instructors from 12 San Francisco Bay area hospitals banded together to share critical care orientation teaching tasks. The instructor from one hospital teaches the cardiovascular component, another teaches neuro nursing, another pulmonary, another hemodynamics, and a fifth teaches renal nursing care to orientees from all the hospitals. In this way, the cost of critical care orientation programs are significantly reduced by eliminating redundant courses in each hospital.

The Nursing Shortage

The healthcare community is in the midst of a growing nursing shortage. The average community hospital RN vacancy rate rose from 4.4 percent in 1983 to 11.3 percent in December, 1987 (*Source: Health and Human Services Commission on Nursing*). In 1989, the extent of the shortage continues to be widespread and affects hospitals of every size, as reported in *Hospitals* (Volume 63, No. 9).

Table 3.5: The Nursing Shortage in 1989

Bed Size	No shortage	Mild	Moderate	Severe
1 to 49	27.8%	24.0%	32.9%	15.2%
50 to 99	22.7	30.6	35.7	10.8
100 to 199	17.1	29.2	42.0	11.5
200 to 299	14.6	25.6	49.5	10.1
300 to 399	18.0	25.0	45.8	11.1
400 to 499	17.7	33.3	26.6	22.2
500-up	7.1	24.2	45.7	22.9

Source: AHA, Hospital Nursing Personnel Survey - 1988, 1989

Additional RNs with Greater Expertise Required

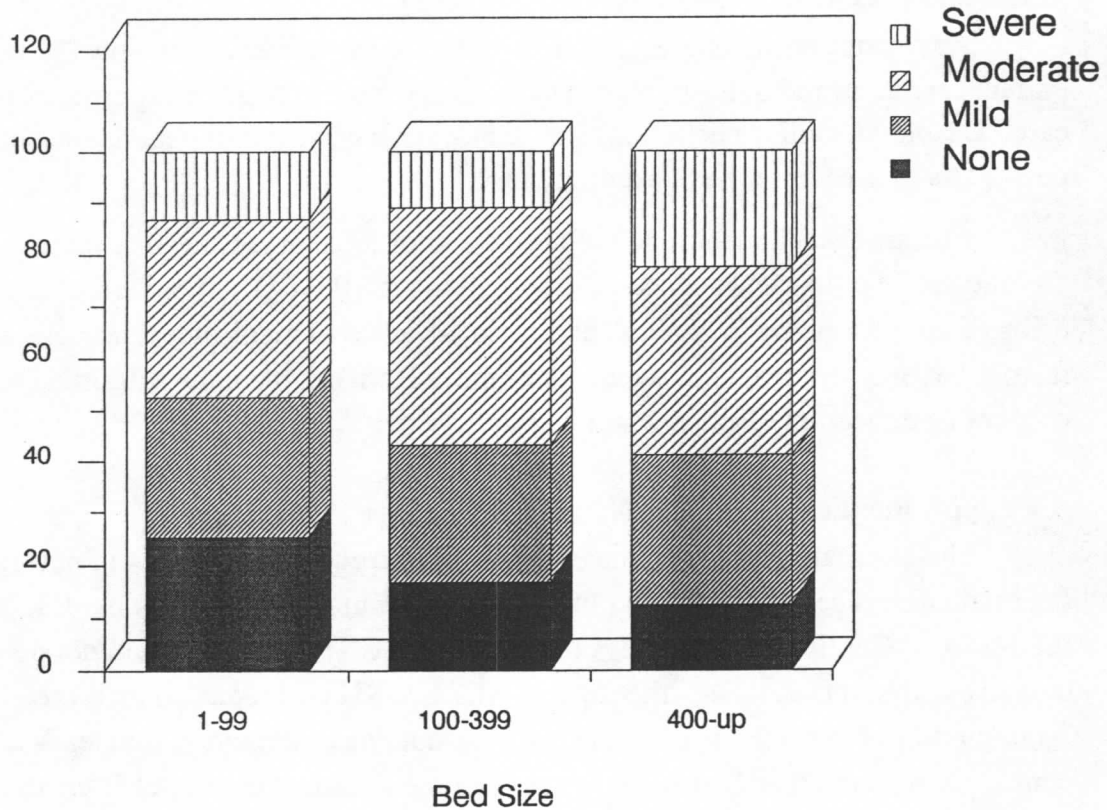
As a result of the implementation of the DRG payment plan, only the sickest patients are admitted to hospitals — those who are most in need of expert nursing care. Despite declining admissions and lengths of stay, hospitals need increasingly more RNs to care fewer but sicker patients.

Factors that contribute to the need for additional nurses include the increased use of outpatient services, the spread of the HIV (AIDS) epidemic, the aging of the population in general, and rapid advances in medical technology. These factors not only contribute to the need for more RNs, but mandate retraining and continuing education of existing nursing staff.

RN Supply Further Reduced by NCLEX-RN Failure

Hospitals and nursing homes, the two most frequent employers of new nursing graduates, recently suffered a blow when 2,500 nursing school graduates failed the National Council Licensing Examination (NCLEX) exam and could not be employed as RNs, thus reducing the supply. NCLEX-RN (National Council Licensing Examination - RN) is the nationwide, two-day nursing examination that leads to licensure as a Registered Nurse. Between the time a student graduates from a school of nursing until passing the examination and becoming licensed to practice, he or she may work as a graduate nurse under a state-issued permit, but not as a licensed professional.

Graph 3.5: Nursing Shortage by Hospital
Bed-size, 1989



Effects of Nursing Shortage

Hospitals Spending More to Keep Nurses

When a single bed is closed due to the lack of nursing staff, the cost to the hospital can amount to \$1,000 a day, or over \$350,000 a year. As a result, administrators are taking dramatic steps to retain the nurses they have and to recruit the nurses they need to keep beds open.

During the past year, the most frequently used recruitment and retention strategy was to increase salaries. To entice and retain the better-educated nurse, 31 percent of hospitals paid more for a nurse with a BSN (Baccalaureate in the Science of Nursing) degree.

Enticing Recruits and Staff with Education

Hospital administrators, recognizing that education is a highly desired benefit for nurses, are instituting educational programs as incentive to retain their employed nurses and as an enticement for recruiting new nurses. Among the educational benefits offered by hospitals are tuition reimbursement (offered by 98 percent of surveyed hospitals), paid time-off for seminars and continuing education (85 percent), and scholarships to student nurses (27 percent in the West and 46 percent in North Central states).

Increasing the RN Supply Through Hospital-Sponsored Programs

To increase the supply of RNs, hospitals are instituting programs to upgrade allied health workers such as paramedics and to retrain foreign-educated nurses. In addition, they are recruiting and providing educational programs for RNs reentering the job market and non-nurses seeking a second career.

These hospital educational programs are either held on-site, as a joint venture with a college in the community, as work-study programs, or through provision of funds (in the form of interest-free loans, matching-fund programs, scholarships, tuition grants, or tuition reimbursement plans).

Problems With the Use of Floating Nurses

Many hospitals, unable to locate or afford sufficient staff, find floating nurses between units a necessity. A 1988 AHA survey indicates that in 35 percent of the responding hospitals nurses floated between specialty units. According to legal experts, litigation involving inadequately prepared nurses on understaffed units has resulted in expensive claims against hospitals. Similar judgments, they say, could be

handed down in cases that involve floating nurses. To avoid potential litigation, quick, effective review programs must be available to cross-train these nurses.

Problems With the Use of Temporary Agency Nurses

To fill short-term staff nurse vacancies, hospitals hire nurses from temporary agencies. In 1987, the proportion of community hospitals that use temporary agency nurses increased by more than 50 percent. Hiring temporary nurses can cost a hospital more than twice what it pays an employed nurse. More importantly, all agency nurses may not meet the educational standards of the hospital. Some hospitals provide orientation programs, administer competency examinations, and provide remediation to bring agency nurses up to standards—but not all hospitals can afford such programs. Most hospitals must depend upon the agency's selection of quality temporary nurses, as well as upon the agency's own educational programs to adequately prepare their nurses for work in a variety of hospitals and nursing units.

Other Factors Influencing the Market

Mandated Education & Certification.

The Joint Commission on Accreditation of Healthcare Organizations (JCAHO), the Occupational Safety and Health Administration (OSHA), and individual hospital policies mandate annual continuing education programs. To comply with JCAHO requirements, each hospital RN spends at least one eight-hour day annually in CPR re-certification, reviewing fire safety, back safety, and infection control procedures. OSHA requires hospitals to provide information about working with hazardous chemicals. Several states mandate educational programs for their nurses. Florida for example, now requires four hours of AIDS education, and Washington state requires evidence of AIDS education with license renewal.

Different hospitals mandate their own education and certification programs—such as quality assurance programs on medication errors or re-testing pharmacology knowledge. Nurses who work in specialized departments such as critical care spend additional time on review and certification. Many hospitals now require annual ACLS (Advanced Cardiac Life Support) re-certification for its critical care nurses.

Continuing Education & Training

Inservice programs are used to update nurses on new equipment, new procedures, new medications, and new hospital policies. In addition, 17 states require a

specified number of hours of continuing education or continuing education units (CEUs) for RN relicensure. As a recruitment and retention benefit, 85 percent of US hospitals surveyed provide paid-time off for continuing education and seminars. To generate revenues, many hospitals provide seminars and courses for continuing education credit, not only for their own nurses but for RNs outside the hospital. Some hospital education departments, such as Scripps Memorial's in San Diego, market their continuing education programs nationally, delivering the courses and CEUs by mail.

Advanced Certification.

As a group, nurses are committed to continuing education and acquiring advanced knowledge in their specialty, not simply for relicensure. For example, since it was established in the early 1970's more than 29,000 critical care nurses have been certified through the CCRN (Critical Care RN) certification examination. In 1989 alone, 4,679 critical care nurses took the exam. During the past 10 years, the American Nurses Association (ANA) has instituted certification examinations in a variety of nursing specialties including nursing management, medical-surgical nursing, emergency room, and maternity nursing. Today there are 19 areas of certification, and 1989 applications to take the exams are up 20 percent over 1988. More than 16,000 nurses have applied for these examinations in 1989. To prepare nurses for these certifying examinations, hospitals, schools, and nurse entrepreneurs provide review courses.

Retraining

Not only are the needs of hospitalized patients changing, but the level of expertise needed by their nurses is changing. For example, nurses who have been working on medical units for years now are expected to care for patients on ventilators and cardiac monitors — equipment that was seen only by critical care nurses in the past. Now, nurses who work on maternity units must learn to read and interpret fetal heart monitors. Nurses in all specialty areas must learn how to perform new skills.

Cross-Training

Because of the nursing shortage, the practice of pulling/floating nurses from one unit to work in another has become commonplace. A nurse may or may not have the skills to adequately care for patients in these other units. While all RNs

have had basic training in all areas of nursing, new procedures, new medications and new methods of patient care make it impractical to keep up to date in each specialty.

To maintain a high level of productivity in every unit to and avoid potential legal consequences of assigning a nurse to a specialty area where his or her knowledge and skills are out of date, hospitals are seeking cost-effective methods for cross-training. With cross-training, nurses can provide competent and safe care to patients in more than one specialty unit.

Business & Management Skills.

Because hospitals are now run more like business organizations, nurses today are expected to participate in policy and management decision-making, unit budgeting, human resource management, negotiating, and customer relations. Giving staff nurses opportunities to become involved in policy and management decision-making is also a strong retention strategy.

Business and management skill training has become essential for the head nurse, or nurse manager. The majority of these managers were trained as bedside nurses and were promoted into management positions as a reward and as means of increasing their salary range. Often, these nurses are asked to perform business and management tasks for which they were never adequately trained.

Orientation

Each nurse hired by a hospital must go through a general hospital orientation program and then orientation to the unit of hire. The purpose of these programs is to insure a minimum standard of clinical knowledge and nursing skill competency among new employees. The orientation period is expensive, not only because of the time invested by the education department, but because these nurses are drawing a salary during a time they are not otherwise productive.

Orientation includes presentations on the hospital's organizational structure, policies, and procedures. Quality assurance issues of special importance, such as patient safety and medication errors also are covered. Reviews of nursing procedures and content assure a standard level of knowledge of all RNs working in the hospital. This period also is used for the annual review of JCAHO mandated inservice programs. Testing typically includes CPR recertification, and a medication test indicating knowledge of drugs, their dosages, and their administration. All nurses, with all levels of education and experience receive all of the same information.

Need to Accommodate Foreign-Trained and ESL Nurses

Now, more than ever, hospitals are hiring more foreign-trained nurses and more nurses for whom English is a second language (ESL). The most obvious reason is that there is an increasing percentage of foreign-born people in the general population. In addition, because of the nursing shortage, hospitals are actively recruiting foreign-trained nurses. These nurses, educated outside of the US, present two problems for hospitals. Their education is different from that of US-educated nurses, and frequently there is a communication problem.

Nursing Homes Feel Similar Pressures

While nursing homes were traditionally populated with "older" patients, today 40 percent of those requiring long-term care are under the age of 65. Due to early discharge from the acute care hospital, those patients who are unable to return home and receive adequate care are admitted to long-term care facilities. In addition there are growing numbers of patients with chronic conditions who require long-term expert care such as those who suffer from Alzheimer's, AIDS, and related illnesses.

The education needs of all nursing home personnel are expanding. Personnel not only must be trained to provide appropriate care for the changing patient population, but also will be required to conform to the the Nursing Home Quality Reform Act which is scheduled to go into effect in 1990. The Act requires a higher minimum RN staffing ratio as well as mandates that all newly licensed aides working in nursing homes be given at least 75 hours of preservice training.

The Nursing School Market

School Expenditures

More than \$2.3 billion are spent annually to educate the 200,000 plus students enrolled in 1,642 nursing programs across the country.

This figure was derived from a reported cost of \$45,000 per BSN (Baccalaureate in the Science of Nursing) student in 1986 at one school of nursing in St. John's, Newfoundland, Canada. No comparable cost studies exist for U.S. schools of nursing offering BSN programs, ADN (Associate Degree in Nursing) programs, or diploma schools. This calculated cost includes salaries (faculty, staff, research

assistants, etc.), operating costs (supplies, telephone, photocopying, etc.), capital costs (computers, teaching aids, etc.), library services, computing services, technical services, building and campus maintenance, utilities, university administration, and student services.

By calculating one-fourth the cost of a four-year BSN program in St. John's, Newfoundland in 1986, it can be estimated that the average annual cost to educate one student in a U.S. school of nursing is \$11,250 per year. This figure can be multiplied by the 206,275 students enrolled in all U.S. schools of nursing in October, 1987 to arrive at the estimated annual rate of expenditure of \$2.3 billion.

Primary Factors Influencing the School Market

The Decline in Nursing School Enrollment

In spite of the growing number of ADN, BSN, and BRN programs over the past 20 years, enrollments in basic RN programs have been declining since 1983. While enrollment in three-year diploma programs has been decreasing slowly since the early 1970s, enrollment in BSN and ADN programs has dropped precipitously in recent years. In the past ten years enrollment in all basic programs declined 23.6 percent, but the dramatic 60.6 percent decrease in diploma program enrollment accounts for much of this decline. BSN enrollment hit its peak in 1977 and has fallen 26.3 percent in the past ten years.

Table 3.6: Total Enrollment in Basic RN Programs 1978 to 1987

	1977	1980	1983	1986	1987
Total	245,390	230,966	250,533	193,712	182,947
Diploma	52,858	41,048	42,007	22,641	18,927
ADN	91,102	94,060	109,605	89,469	90,399
BSN	101,430	95,858	98,941	81,602	73,621

Nursing Data Review, 1988, NLN Division of Research, 1989

As the emphasis on collegiate preparation for nurses has grown, interest in the technically oriented diploma program has declined. More potential RNs are opting for the two-year ADN program versus the commitment to a three-year diploma program. This preference is readily observed in the enrollment differences

between the three types of basic nursing education programs. Because of the collegiate emphasis, four-year BSN enrollments have declined less precipitously than would be expected otherwise. BSN enrollments actually are bolstered by the surge of RNs returning for this degree.

Lure of Other Professions

The overall decline in RN program enrollments reflect not only the diminishing pool of high school graduates, but the expanding opportunities for women in other professional careers. In a survey of entering freshmen at 562 two- and four-year institutions, 22 percent of the freshman women preferred a business career, 12.3 percent were interested in teaching, and 3.3 percent wanted to become physicians. Only 2.4 percent chose nursing. Of the freshman women entering two-year colleges, 5.8 percent chose nursing.

Effect on Schools of Nursing

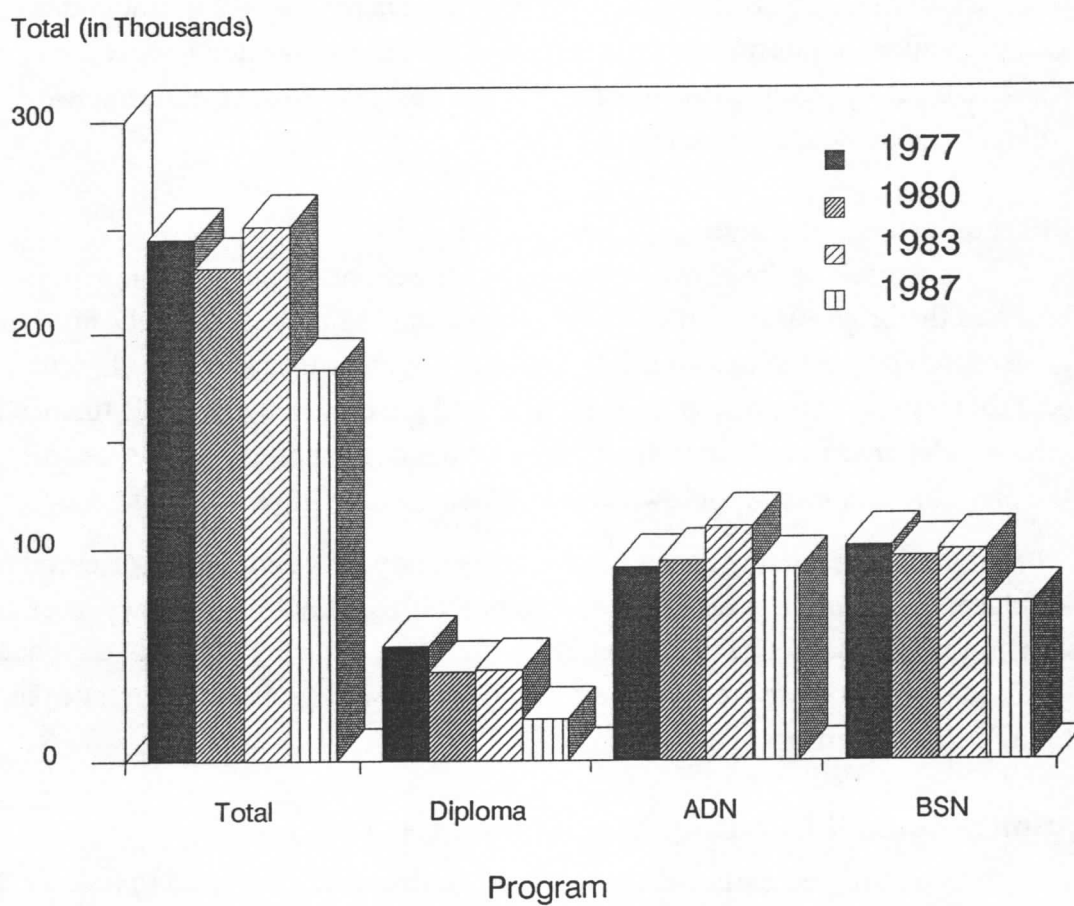
As a result of the decline in enrollments, schools of nursing compete for the best and the brightest students. Those schools whose numbers of applicants have decreased, are beginning to lower their admission standards to keep enrollments at acceptable levels. This phenomenon has occurred not only in the publicly financed schools who are funded according to the number of attending students, but also in the privately financed schools who depend heavily on tuition revenues.

Schools of nursing have become a very competitive consumer-oriented marketplace. To maintain good solid enrollments with quality students, they must be able to say they have a quality program and produce a quality product - a graduate who can pass the licensure examination and who is well-prepared to practice in today's clinical settings.

National Council Licensing Examination (NCLEX)

As mentioned earlier, nursing school graduates are required to pass the National Council Licensing Examination (NCLEX) that leads to licensure as a Registered Nurse. The national failure rate on the July, 1988 NCLEX reached a record high of 16.4 percent. By contrast, the failure rate in the July, 1987 administration was nine percent. The increased failure rate may be explained in part by the fact that a new test plan was introduced in 1988 and that the tests' passing standards became slightly more rigorous.

Graph 3.6: Total Enrollment in Basic RN Programs, 1977-1987



Recent changes in the NCLEX test plan include fewer questions on pediatric, obstetrical, and psychiatric nursing and more emphasis on medical-surgical and gerontological nursing — areas where most entry-level RNs are employed.

New questions that seemed to create the biggest surprise to nursing school faculty were those that addressed supervision and management skills. New question topics, added in response to a 1987 survey of activities performed by RNs, included assisting staff to respond to complaints, planning assignments for ancillary staff, identifying patients who need isolation, responsibilities for checking accuracy of orders, handling contraindicated orders, and recommending changes in drug therapy.

Strong Motivator for Administration

When the results of the NCLEX failures were released, faculty and nursing school administrators began to search for educational methods and materials that would improve the passing rates of their students, especially in the new topic areas. The increased rate of failure may have denied the hospitals RN practitioners, but it was strong motivation for schools to revamp and update their curricula.

Chapter 4

The Growing Use of Microcomputers

Microcomputers In Schools of Nursing

The use of microcomputers in schools of nursing has increased steadily. The results of surveys conducted by the National League for Nursing and by the Southern Regional Education Board (SREB) substantiate this growth and illustrate the specific uses of these tools.

The growth in the use of microcomputers in schools of nursing has been dramatic. In 1982, only seven percent of the schools of nursing were using computers. In just six years, the percentage was almost reversed. In 1988, only 10 percent of the 198 responding schools in an SREB survey were *not* using computers.

Penetration of the Microcomputer in Schools

In 1985, the Southern Regional Education Board began a three-year project, funded by a grant from the Division of Nursing, US Department of Health and Human Services, to integrate the use of microcomputers for nursing education in 15 southern states. To demonstrate its accomplishments, surveys of 424 BSN and ADN programs were conducted in 1985, 1987 and 1988. In 1987, the survey also was sent to 877 nursing programs outside the SREB region to compare computer activity in the SREB schools with schools of nursing across the nation.

Table 4.1: Rate of Growth in the Ownership of Microcomputers in SREB ADN and BSN Schools and Nationally

	1985	1987	1988
SREB Schools*			
ADN	49%	53%	63%
BSN	58%	74%	80%
ADN & BSN	53%	62%	71%
National BSN**	77%		
National ADN & BSN***		71%	

* n = 263 (62%) ** n = 305 (53%) (n = # of schools surveyed; percent = % responding) *** n = 287 (33%)

8 & *** Aiken, E. (1985, 1987, 1988). *Computer use in undergraduate nursing education programs: A study of 550 programs*. Atlanta, GA: Southern Regional Education Board.

***Bolwell, C & Thomas, B (1986). *The use of microcomputers for educating nurses in the United States*. in MEDINFO 86 (R. Salamon, B. Blum, M. Jorgensen, Eds). North-Holland: Elsevier Science Publishers. pg. 955-959.

Types of Microcomputers Owned by Schools of Nursing

A 1988 survey of *Nursing Educators MicroWorld* (NEM) subscribers sheds some light on the hardware ownership in schools of nursing. The wide array of hardware types would suggest two important tendencies. First, schools hang on to the hardware they have and make do. Those schools that purchased Apple IIs early on still have them sitting next to their newly acquired IBMs.

Second, cost is of great importance. The most frequently owned computer types are clones and compatibles, noted for their discounted prices. While there are "name brands" listed among the compatibles (Zenith being the most frequent and Leading Edge the least) the IBM name is not an important criteria for purchase.

Table 4.2: Brands of Microcomputers Used in Schools of Nursing, 1988

	NEM Survey * (1988, n = 122)	National SREB Survey (1987 n = 287)
IBM Clones & Compatibles	32.7%	**
IBM-PC/XT/AT only	22.9%	32%**
Apple II & IBM	16.9%	45%
Apple Macintosh	13.1%	***
Apple II only	7.3%	23%***
IBM-PS/2	4.0%	**

* Percentages do not add up to 100% because some schools have more than one brand of microcomputer.

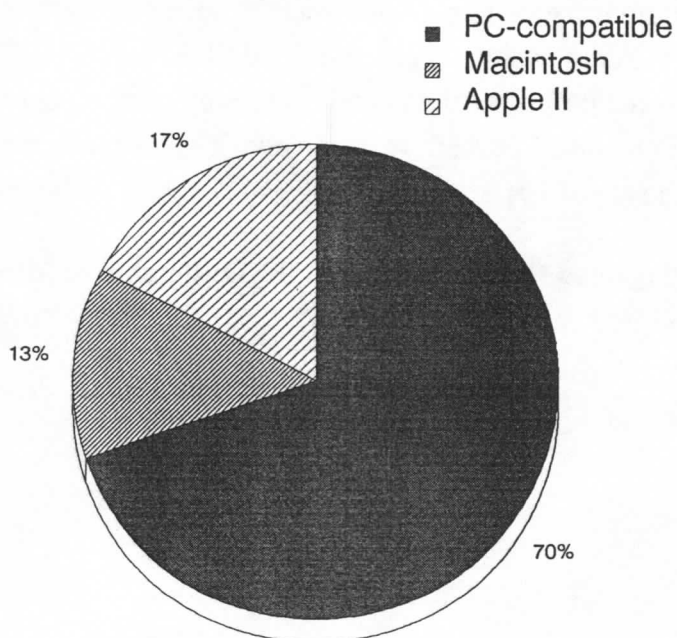
** IBM vs clones & compatibles not differentiated. PS/2 not introduced at time of survey

*** Apple II vs Macintosh not differentiated

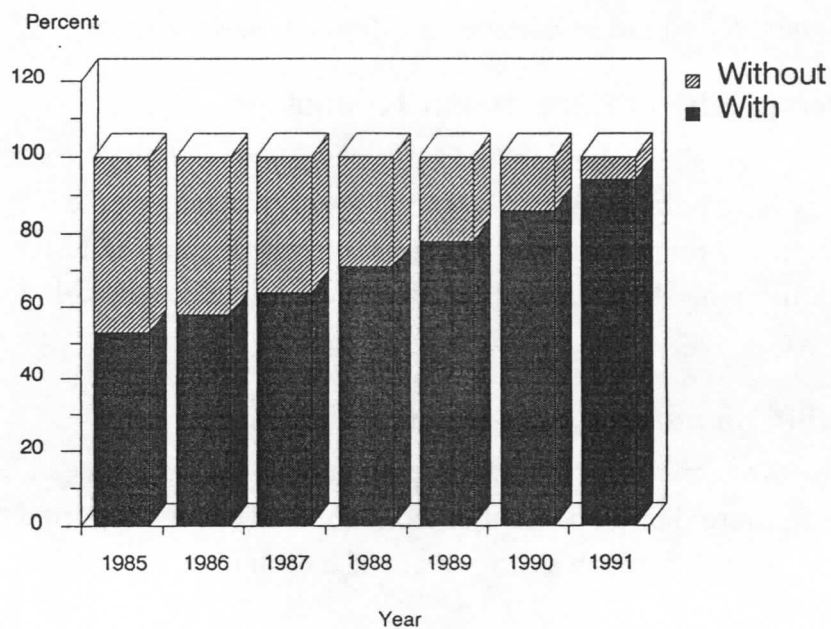
Aiken, E. (1987). *Computer use in undergraduate nursing education programs*. Atlanta, GA: Southern Regional Education Board.

Bolwell, C. (1989). *Nursing Educators MicroWorld*. Volume 3, Number 2, pg. 10

Graph 4.2: Brands of Microcomputers Used in Schools of Nursing, 1988



Graph 4.3: Projected Rate of Growth of Microcomputers in Schools of Nursing



Projected Growth of Micros in Schools of Nursing

The growth of interactive videodisc hardware acquisition in schools of nursing can be predicted by determining the historical growth of microcomputer acquisition. The compound growth rate of ownership of microcomputers in schools of nursing was calculated using three sequential SREB surveys. The three surveys (1985, 1987, and 1988) show the actual ownership of microcomputers was 49 percent, 53 percent, and 71 percent respectively. This increase equates to a compound annual growth rate of 10 percent.

Graph 4.3: Projected Rate of Growth in the Ownership of Microcomputers in Schools of Nursing (CGR = 10.0%)

	Total SREB Actual	National total Calculated
1985	49%	53%
1986		58%
1987	53%	64%
1988	71%	71%
1989		78%
1990		86%
1991		94%

These calculations are based on the ownership in schools of nursing in the 15 SREB states. Because the 1987 SREB survey of national nursing programs ($n = 263$) and SREB ($n = 287$) schools of nursing indicated 71 percent total ownership nationally vs 62 percent in SREB schools, these projections are conservative and may err on the low side.

Bolwell, C. (1989) Nursing Educators MicroWorld, Volume 3, Number 5, pg. 39.

Faculty Perspective of Educational Technology

While not all nursing school faculty are jumping on the technology bandwagon, they have admitted that microcomputers are changing the way nurse educators teach. More than 75 percent of the faculty who responded to the 1988 SERB survey felt there had been some change in teaching and learning due to the presence of computers.

Use of CAI (Computer-assisted Instruction)

The use of microcomputers to teach nursing is growing steadily. In the same 1988 survey, more than 50 percent of the schools of nursing reported using microcomputers to teach as much as 25 percent of their nursing curriculum. This figure

represents a dramatic growth of 168 percent over the 20.9 percent of the faculty respondents who were using micros to teach nursing the preceding year.

In addition, CAI is finding its way into the curriculum as a requirement rather than as a supplement. In 1987, 81 percent reported using CAI only as a supplement to required study. In 1988 that figure had dropped to 47 percent—showing that microcomputer programs were quickly becoming part of the regular curriculum.

These data compare favorably with national data collected by the NLN two years earlier (in 1986) when it found that in 78.7 percent of the generic BSN schools of nursing, one or more faculty had integrated the use of microcomputers in their courses. The faculty in the diploma schools lagged behind with only 44 percent integrating micros. Surprisingly, among the ADN schools, which generally are very interested in technology and education, only 58 percent of the schools reported that faculty were integrating micros into their courses.

Types of CAI Used

The CAI program most frequently used in 1988 was the patient care simulation. This fact has not changed since a 1986 survey by Hebda indicating that the most frequently owned CAI software were simulations.

Table 4.4: Types of CAI Used in Schools of Nursing, 1985 & 1988

Type	% of Schools	
	1985*	1988**
Simulations	49%	81%
Tutorials	49%	80%
Drill & Practice	30%	76%
Games		42%

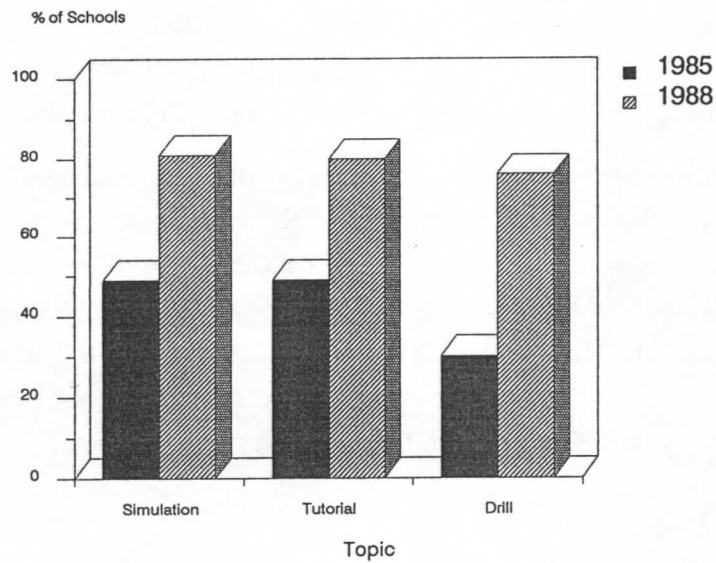
* Bolwell, C & Thomas, B (1986). *The use of microcomputers for educating nurses in the United States. in MEDINFO 86* (R. Salamon, B. Blum, M. Jorgensen, Eds). North-Holland: Elsevier Science Publishers. pg. 955-959.

** Aiken, E. (1988). *Computer use in undergraduate nursing education programs: A study of 550 programs. Atlanta, GA: Southern Regional Education Board.*

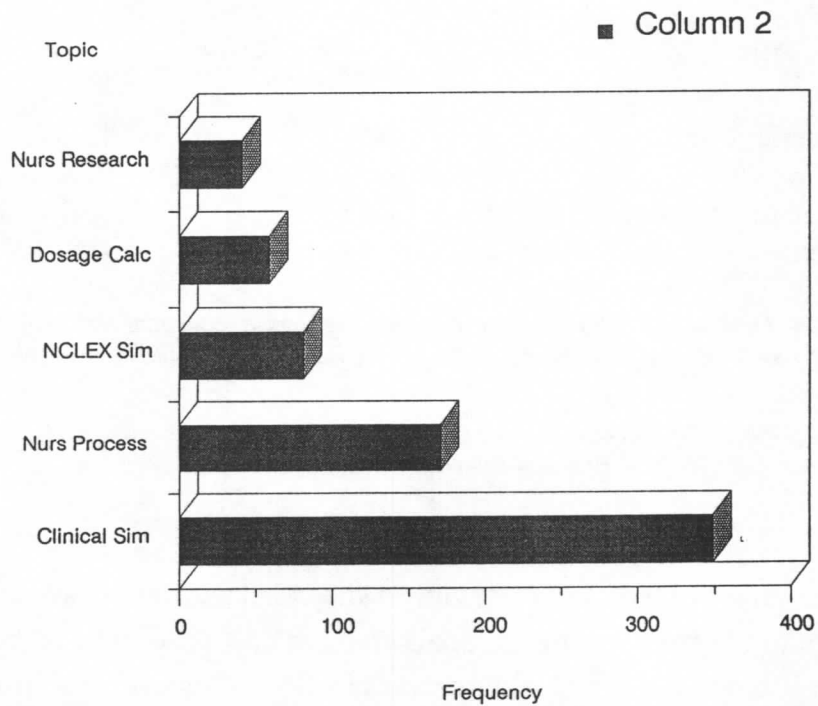
Topics of CAI Software Purchased

The topics of the most frequently owned CAI software in schools of nursing has changed little between the national survey of BSN schools by Hebda in 1986 and the SREB survey of BSN and ADN schools in 1987. Clinical simulations with a vari-

Graph 4.4: Growth of CAI Programs by Type in Schools of Nursing, 1985-1988



Graph 4.5: Most Frequently Owned Topics of CAI Software by SREB ADN and BSN Schools, 1987



ety of patient care scenarios and problems are the most popular. In addition, nursing process tutorials and the simulated NCLEX testing software remain popular, as well.

Table 4.5: Most Frequently Owned Topics of CAI Software, 1986 & 1987

1986 National BSN Schools frequency		1987 SREB ADN & BSN frequency	
Clinical simulations	165	Clinical simulations	349
Dosage calculation	137	Nursing process	171
NCLEX preparation	93	NCLEX preparation	81
Nursing process	59	Dosage calculation	59
Nursing research	40	Nursing research	41

Hebda, T. (1986) A Profile of Computer-assisted Instruction Use Among Baccalaureate Nursing Programs. (Doctoral Dissertation). PA: University of Pittsburgh.

Aiken, E. (1988). Moving Into the Age of Computer Supported Education: A Regional Experience in Nursing Education. Atlanta, GA: Southern Regional Education Board.

This data reflects not only the significant interest in clinical simulations, but also the availability and the perceived usefulness of the other topics. The dramatic increases in ownership of clinical simulations is partly due to the increased availability of this software. Many new simulations were developed and marketed between the time of the two surveys.

While there was no new development of nursing process programs during that period, the increase in sales indicates the growing interest in, perceived value of, and usefulness of teaching this topic via computer. The perceived usefulness of programs that allow students to prepare for the NCLEX by answering questions that simulate those asked on the NCLEX remained high. In addition, because these review programs are computerized, students get immediate feedback about their performance and areas of strength and weakness — a valuable benefit.

In-House Development of CAI Software

Both the 1986 Hebda survey and the 1987 SREB survey indicate the level of interest in "do-it-yourself" software development. Among the SREB schools, 21 percent had purchased authoring programs indicating an intent or desire among schools to author their own CAI software.

By contrast, a high percentage of the BSN school faculty responding to the Hebda survey not only developed CAI software, but sold it as well. Of the BSN schools of nursing who reported using CAI software in the Hebda survey, 39 percent had developed their own CAI programs.

Interestingly, many faculty who developed software not only used it themselves, but sold it to other schools of nursing. Among the 198 CAI program titles listed in Hebda's 1987 survey, 70 titles (35 percent) were developed by a nursing educator and were made available by the nursing educator or the educator's school.

Microcomputers In Hospital Education Departments

Survey of Microcomputer Ownership

According to the only known published survey of microcomputer use in community hospital education departments, nurse educators use microcomputers for administrative tasks and for nursing education.

In October 1985, American Hospital Association (AHA) designated community hospitals were surveyed by Diskovery: Computer-Assisted Healthcare Education to determine the use of microcomputers for nursing education. Surveys were mailed to 639 randomly-selected community hospitals. There was a 43 percent (274) response rate.

Of these respondents, 24 percent said that their hospital's nursing education department was using microcomputers. Frequency of use was predicated by bed-size. In hospitals of more than 300 beds, 40 percent reported they were using microcomputers, while only 10 percent of hospitals with fewer than 100 beds were reported using them.

A greater percentage of the larger hospitals also planned to incorporate the use of microcomputers within the following two years. In hospitals with 300 or more beds, 75 percent of the education departments reported definite plans to use microcomputers within two years.

Table 4.6: Use & Planned Use of Microcomputers in Hospital Education Departments, October, 1985.

	< 100	Bed-Size 100-300	300
Using micros now	10%	26%	40%
Plan to use within 2 years	24%	46%	75%

Bolwell, C & Thomas, B (1986). The use of microcomputers for educating nurses in the US. In MEDINFO 86 (R. Salamon, B. Blum, M. Jorgensen, Eds). North-Holland: Elsevier Science Publishers. pp. 955-959.

Variables Influencing Microcomputer Ownership

Two significant variables separated the haves from the have-nots and could be important in planning interactive videodisc marketing. First, no matter what their bed-size, hospitals with microcomputers installed in other departments also installed micros in their education departments. Second, education-oriented hospitals, those that provided clinical experiences for student nurses and those that employed more full-time educators (FTEs), tended to install micros in their education departments. A real surprise was the significant negative correlation in medium and small hospitals associated with a college or university. When it came to hardware acquisition, it appeared that for hospitals with less than 300 beds, affiliation with a school had a negative impact.

Table 4.7: Variables Affecting Ownership of Microcomputers in Hospital Education Departments

	Owners by Bed Size					
	Have Micros < 100 / 100-300 / > 300			Do Not Have Micros < 100 / 100-300 / > 300		
Mean # FTEs in Education Dept.	1.1	4.2	9.8	0.8	2.2	8.0
Provide Student Nurse Experience	80%	100%	41%	91%	71%	40%
HIS Installed	60%	61%	85%	57%	33%	25%
Micros in Other Departments	100%	89%	100%	36%	9%	3%
Affiliated with College/University	20%	21%	41%	91%	71%	40%

Bolwell, C. (1986). The use of microcomputers for educating nurses in the United States. In MEDINFO 86 (R. Salamon, B. Blum, M. Jorgensen, Eds). North-Holland: Elsevier Science Publishers. pp. 955-959.

Projected Growth of Microcomputers in Community Hospital Education Departments

The compound growth rate of ownership of microcomputers in hospitals was calculated using the known installation of microcomputers and the number of hospital education departments that had definite plans to purchase micros — which equates to a compound annual growth rate of 10 percent.

Graph 4.8: Projected Rate of Growth in the Ownership of Microcomputers in Community Hospital Education Departments with More Than 100 Beds

	Actual	Calculated
1985	31%	31%
1986		34
1987	38%	38
1988		41
1989		45
1990		50
1991		55
1992		60
1993		66
1994		73
1995		80
1996		88
1997		97
1998		100

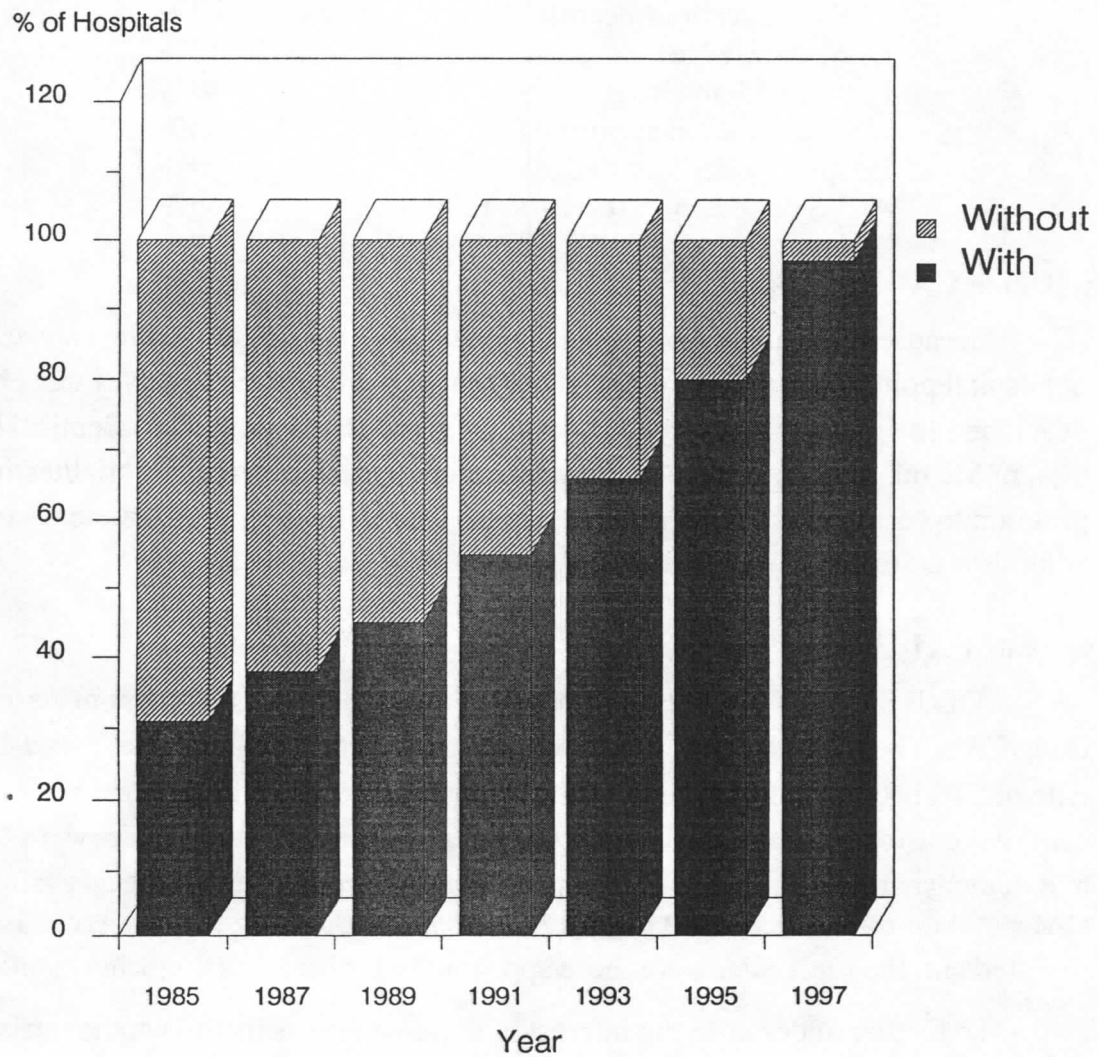
Bolwell, C. (1989) Nursing Educators MicroWorld, Volume 3, Number 5, pg. 39.

The Use of Microcomputers for Nursing Education in Hospitals

The most frequent use of micros by nursing education departments was for testing and certification. Of the respondents using micros, 64 percent reported using them for CPR and ACLS testing, certification and recertification, testing drug knowledge and calculation accuracy, and testing knowledge of hospital procedures and policies.

This relatively common application is not surprising. These testing procedures are common to all hospitals and require a good bit of the educator's time, not only in test administration, but in scoring and recording the scores. In all hospitals, all RN employees are CPR certified or recertified annually. Many hospitals require annual ACLS recertification of their critical care nurses. Drug knowledge and calcu-

Graph 4.8: Projected Rate of Growth of Microcomputers in Community Hospital Education Departments with More Than 100 Beds



lation accuracy and knowledge of hospital procedures and policies are tested during each general hospital orientation. In hospitals with high turnover, general orientations is presented as often as twice monthly. Computerization of these activities results in a significant time-savings.

Table 4.9: Use of Micros for Testing

Type of Testing	% of Micro Users
CPR certification/recertification	67%
Drug knowledge	50%
Procedure knowledge	48%
Drug calculation accuracy	42%
Hospital policy knowledge	38%
ACLS certification/recertification	30%

In-House CAI Development

Because there are no commercially available programs for testing knowledge of hospital policy and procedures, hospitals that participated in the survey must have developed their own hospital-specific testing programs. An example is Baptist Hospital of Miami, that developed not only a six module chemotherapy tutorial/testing program to certify its oncology nurses, but also its own medication competency test administered to each new RN employee.

Types of CAI Used

Of all the hospitals that reported using microcomputers, 47 percent were using CAI. The most frequently used type of CAI was drill and practice, also the type of CAI program most available at the time. A surprising three-fourths (77 percent) were using simulations. The most frequently used simulation topics were CPR and hemodynamic monitoring. When this survey was completed, of the 54 available CAI simulations described in Bolwell's *1986 Software Directory*, 21 were critical-care oriented and the remainder were more appropriate for basic nursing school students.

To further underscore the interest of these educators in using computerized clinical simulations, the responding educators stated that they planned to use more patient care simulations in the future and noted a special interest in those oriented to high-risk situations in medical-surgical nursing, psychiatric, obstetrical, pediatric, and critical care nursing.

CAI Simulations for Critical Care

In response to this expressed need, the 1986 President of American Association of Critical Care Nurses (AACN), spearheaded a drive to solicit bids from CAI developers to publish simulations for critical care nurses. The contract was awarded to Medi-Sim, Inc., a prolific developer of CAI software for nursing education. Over the intervening years, in this joint-venture with AACN, Medi-Sim has developed 50 CAI simulations for critical care nurses.

The 50 programs include content from the AACN core curriculum as well as programs of interest to AACN specialty groups such as neonatal and pediatrics. The core curriculum was developed as a framework for the Critical Care RN (CCRN) certifying examination and is used as an outline for presenting critical care orientation programs.

Critical care educators use these simulations today as audiovisual aides and discussion stimulators in critical care orientation courses and to test critical care knowledge. Critical care nurses use them for review, for preparation for the CCRN examination, and for the acquisition of continuing education units (CEUs) required for RN relicensure and for CCRN recertification. The 29,000 nurses who have been certified as CCRNs are required to accrue 100 hours of continuing education every three years to be eligible for recertification.

Geographic Areas of Hospitals with the Greatest Interest in Educational Technology

In planning marketing strategies, it is helpful to know the geographic areas where hospitals exhibit the greatest degree of interest in the use of technology in nursing education. When survey respondents were separated into American Hospital Association regions, it was evident that while Pacific and New England states are notable centers for high technology, the hospitals in these regions showed the least interest in technology for nursing education.

Table 4.9: Percentage of Survey Respondents Using and Planning to Use Microcomputers for Nursing Education

AHA Region	Percent of All Respondents from Each AHA Region	
	% Using Micros	% Planning to Use
South Atlantic	31%	25%
Middle Atlantic	30%	50%
Mountain	29%	31%
East North Central	28%	48%
West North Central	26%	30%
Pacific	25%	54%
East South Central	11%	29%
West South Central	10%	48%
New England	7%	29%

Pacific states - Alaska, California, Hawaii, Oregon, Washington. Mountain states - Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming. West South Central states - Arkansas, Louisiana, Oklahoma, Texas. West North Central - Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota. East South Central states - Alabama, Kentucky, Mississippi, Tennessee. East North Central states - Illinois, Indiana, Michigan, Ohio, Wisconsin. South Atlantic states - Delaware, District of Columbia, Florida, Georgia, Maryland, North and South Carolina, Virginia, West Virginia. Middle Atlantic states - New Jersey, New York, Pennsylvania. New England - Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont.

Chapter 5

The Emerging Role of Interactive Videodisc

Attributes of Interactive Videodisc Technology

Several inherent attributes of interactive videodisc technology make it a likely solution to many of the nursing education and training problems.

Reduced Learning Time

The literature is replete with research studies that demonstrate reduced learning time using computerized learning materials over traditional learning methods. In her meta-analysis of more than 100 studies in the use of a computer for instruction in higher education, M.D. Roblyer (1985) reported an average of 39 percent savings in time. This figure was corroborated by Dr. Betty Chang (1986) in her meta-analysis of nursing research studies. Dr. Chang reported that nursing students using computer-assisted instruction (CAI) completed the same material in one-third to one-half the time of students taught by conventional methods.

Flexible User Time

Unlike traditional methods of classroom instruction, computerized education and training programs can be used at any time. The learning modules can be made available 24 hours a day, seven days a week. For a profession that requires round-the-clock employment, this characteristic is important.

This constant availability of learning materials was the reason why Jayne Parker of the Children's Medical Services (CMS) in Florida developed 10 interactive videodisc programs for nurse training. CMS needed to educate 200 nurses working in 18 Department of Health and Rehabilitative Service clinics scattered throughout the state. The cost and logistics of taking these nurses off the job, transporting them to a common site, and providing stand-up instruction became prohibitive. While the initial cost of videodisc development was high, CMS found that the expense of development was recovered after obviating the need for 300 hours of stand-up training at a minimum cost of \$44 per hour. These programs, developed between 1981 and 1984, are still in use. Once the programs have been viewed for their educational content, the nurses continue to use the videodiscs as needed for refresher training.

Flexible Selection of Specific Material

The well-designed program offers flexibility of presentation. For example, the CMS staff nurses can access only those portions of the interactive videodisc programs they need to review. In another example, a professor used specific sections of Mirror Systems's *Introduction to Cardiovascular Examination* for two different purposes. Before their clinical day on the pediatric unit, the professor used the program to introduce the students to the sound and underlying physiology of the Split S2, a heart sound. While on the unit, a student reported hearing a murmur. All of the students listened to the child's murmur. At the end of the day, while the sound was still fresh in their minds, the professor again accessed a section of the program that explained the murmur and its pathophysiology.

Self-Paced Learning and Exploration

In well-designed programs, information that is known can be skipped over, and the student can then concentrate on the unknown or less understood sections. In this way, all students can move ahead at their own pace. In addition to the ability to move ahead, one of the greatest benefits of computerized learning materials is the ability to repeat a segment as often as desired. Learners feel comfortable and unrushed, taking as much time as necessary to understand and master the material and feel free to make and correct mistakes.

This attribute is especially important in nursing. For example, a student or a nurse may find that while working through a patient simulation, too much time was spent gathering unnecessary information, or inappropriate decisions were made. With a CAI program, it is possible to re-do the simulation, gather data more effi-

ciently, make better decisions, and experience success. Real-life clinical situations rarely offer such second chances.

The nursing faculty at Hocking Technical College capitalized on this attribute by developing interactive videodisc demonstrations of nursing procedures. With the demonstrations on videodisc, students can not only observe the performance of the nursing procedure as often as desired, but can backup, fast-forward, or freeze frame any portion of the demonstration as they practice the skill.

Appeals to Adult Learners

Malcolm Knowles, father of adult learning theory, once said that the interactive computerized educational program is an ideal learning medium for adult learners. According to Knowles (1984), adults have unique characteristics as learners. Adults are self-directed, take responsibility for their own needs and decisions, bring to a learning activity both a volume and a variety of experiences, and they tend to resist learning situations in which they feel others are imposing their wills on them.

The majority of nurses and nursing students today are more than 23 years of age, have families, and have had a variety of life experiences. The average age of a hospital staff nurse today is 38 years. The median age of the 1988 nursing school graduate and newly licensed RN was 23 years. Only 20 percent of the 1986 nursing school graduates were under 23 — a dramatic reversal from the 70 percent who were under 23 just 20 years ago.

Incorporation of Video and Audio

Nurses collect data and make decisions about patient care based on what they see and hear and feel. While classroom studies provide theory, principles, and rules to guide action — it is only by making observations, collecting data, and making patient care decisions that nurses acquire accurate judgment and clinical decision-making skills. To acquire expertise, the nurse needs to repetitively look and listen to hundreds of clues in hundreds of different patient care situations, learning to identify those that are important and which contribute to an accurate assessment of any one situation. The ideal learning strategy for nursing education, then should include audio and video.

Interactive Video and the Hospital Market

The economic pressures of DRG implementation have forced hospitals to pay attention to cutting costs, increasing efficiency, and getting the biggest bang for their buck. Interactive videodisc technology, because it can be made readily available to all nursing personnel 24-hours a day and seven days a week, and because it can reduce learning time, can be a cost-effective method for providing the nursing education programs that will reduce complications and enhance the clinical and performance outcomes that will be monitored by JCAHO.

Due to the shortage of nurses, it would benefit hospitals to consider the most cost-effective means for keeping its nurses at the bedside delivering patient care, retaining the nurses they have, and, when new nurses are hired, getting them up-to-speed quickly. Education delivered by interactive videodisc can positively influence achievement of each of these goals.

Interactive Video vs Traditional Education Methods

Traditionally, nurses are gathered in groups for classroom-type educational programs. Several repetitions of an inservice program are scheduled to meet the needs of all nurses on all shifts. With the nursing shortage, it has become expensive, frustrating, and time-consuming for inservice educators to provide education and training.

For example, a hospital training department was recently asked to present a mandatory two-hour course on customer relations to its 400 employees. A single instructor prepared and presented the two-hour course, evaluated the learning, and prepared records validating attendance. However, to finally include all 400 employees on all three shifts, each two-hour session had to be repeated 22 times. Some nurses scheduled to attend a session could not leave the unit because of unanticipated emergencies. Several sessions were reduced to only one or two attendees. What appeared to be a relatively simple teaching assignment took two months to complete - not a cost-effective use of an educator's time, energy, or talents.

Had an interactive videodisc program been available on a moment's notice, 24-hours a day, 7 days a week that could be used by one or two nurses at a time, the mandatory course would have been completed easily, and at a lesser cost. The course would have been presented interactively, with learning automatically tested and recorded. A pre-test could have reduced learning time further by allowing the

student access to only the areas where knowledge was deficient. A post-test would have documented that all users knew all of the information.

Keeping Nurses At the Bedside

The Health and Human Services Commission on Nursing strongly recommends computerization to reduce the time away from patient care. While paperwork and charting are primarily responsible for reducing patient care productivity, time for education and training does pull nurses away from the bedside; and traditional methods can be expensive in time and money.

The use of interactive videodisc programs could result not only in decreased time away from the bedside, but in cost-effective achievement of essential and valued education and training, avoidance of costly litigation, and even revenue-generation for hospital education departments.

Use of CAI and Computerized Testing for Orientation

Baptist Hospital of Miami uses computerized tests in its orientation program. Besides using the Actronics CPR System for CPR recertification, the education department has designed and developed a chemotherapy tutorial and certification test for oncology nurse orientees. By computerizing the chemotherapy program, the time required for a nurse to complete it has been reduced 75 percent. The test is scored by the computer, which saves additional time for the educators. Because of the success and time reduction of using these two programs, the entire orientation program is being redesigned. Computerized patient care simulations will be used to detect RN orientees' areas of weakness in application of nursing science and theory and in clinical decision-making. Once the deficits are identified, individualized instruction will be prescribed, including the use of CAI and interactive videodisc programs.

Computer Used as Orientation Facilitator

Lakeland Regional Medical Center in Lakeland, Florida has implemented an individualized, computerized orientation program that easily can be converted to interactive video. As it stands today, the computer tests, facilitates, and directs orientation activities. These activities include reviewing policy and procedure books, listening to audiotapes, viewing videotapes, and completing computerized tests, including Actronics' CPR certification program. The computer documents the understanding and completion of each activity.

CAI and Interactive Video Part of Core Curriculum

Presbyterian Hospital of Dallas educators and nurse managers assign CAI and interactive video programs to their new employees and staff nurses who do not meet items in their core curriculum. At Presbyterian, there is a core curriculum for general orientation and a core curriculum for each nursing unit. RN employees must satisfy each item in the general core curriculum as well as their own unit's. Where deficits are found, a learning contract is made between the educator, the unit preceptor, and/or the unit manager. Self-paced independent study programs are designed to eliminate the deficits. As a result of this individualized approach, general orientation for some experienced nurses has been reduced to as few as 32 hours in this hospital, compared to the typical 80-hour orientation.

Computer Used for Retraining and Cross-training

Hospitalized patients today are sicker, and more complex equipment is being used in their care. For example, nurses who have been working on medical units for years are now expected to care for patients on ventilators, on cardiac monitors, and with central intravenous lines. These patients were automatically transferred to criticalcare units in past years.

A second example are nurses who have been working on maternity units now have to read and interpret fetal heart monitors. As a result, several hospitals are recognizing the value of using CAI programs to teach ECG and fetal monitor interpretation. An additional benefit in using these programs is that rare, unique, and unusual strips can be incorporated into the computerized training. They can also be accessed at any time for instant review by nurses floating to units where these monitors are standard.

Having a quick method for review readily available to the floated nurse would enhance patient safety. A videodisc program that served as a tool for cross-training as well as a quick reference tool would be an ideal solution.

Interactive Video for Training and Business and Management Skills

Until recently, schools of nursing did not include business and management skills in their basic nursing education programs. Business and management skills training has become essential for the head nurse, or nurse manager. Providing staff nurses with opportunities to become involved in policy and management decision-making also is proving to be a strong retention strategy.

Today, nurses are being asked to develop and manage budgets, negotiate equipment purchases, provide leadership and create environments that enhance employee satisfaction to foster retention, and to develop and teach customer relation strategies. With its ability to display video scenarios and provide opportunities to interact with and observe concomitant changes in persons' behaviors and responses, interactive video technology is an ideal environment for staff nurses and nurse managers to learn and test a variety of management strategies.

Cost-Effectiveness of Critical Care Orientation on Videodisc

The greatest cost reduction could be realized by an interactive videodisc critical care orientation program. Because these programs require extensive time and cost and because new employees are paid salaries for a six-week orientation that may be redundant for a number of experienced nurses, interactive video is an ideal solution. Many critical care orientation programs are based on the AACN's (American Association of Critical-Care Nurses) standardized core curriculum. Therefore, development would not be difficult, nor would it be difficult to market.

With the shortage of nurses, non-productive time in orientation is wasteful. Individualized orientation using interactive video can be cost-effective, efficient, and because of its interactivity, of greater interest to nurses who are action-oriented and who resist sitting through redundant orientation lectures.

Interactive Video and the School Market

As a result of the decline in nursing school enrollment, schools of nursing are competing for students. The pool of potential students from which basic nursing schools can recruit students includes high school graduates, allied health workers such as corpsmen, paramedics, and technicians, LVN/LPNs who wish to upgrade their status to RN, RNs educated in diploma or ADN schools who wish to upgrade their status to BSN, and non-nurse graduates in other disciplines.

The majority of potential students are adults who are discerning shoppers, and they are familiar with the role of the nurse in healthcare today and the educational requirements to perform this role effectively. To recruit the best students, schools must provide an education that will prepare the graduate to successfully pass the NCLEX and to competently practice nursing in a variety of settings. Any school today that does not include computer competence among their list of educational outcomes is likely to be rejected by the prospective student.

Schools of nursing who are not filling their enrollment quotas with qualified students are lowering their admission standards. No matter whether the school is publicly or privately financed, revenues depend on the number of enrollments. Once admitted these students must be brought up to standard.

Need for Computer Competence

Potential nursing school students expect their selected school of nursing to prepare them to competently use computers. In a 1988 SREB survey of southern schools of nursing, 167 respondents reported that 98 percent of the clinical agencies where undergraduate students were sent for their clinical experience used computers on a regular basis. Half of these respondents reported that more than 50 percent of these agencies expected their staff nurses to use the computers.

While the need to prepare students for working in a computerized environment is a convincing reason to integrate educational technology in a school of nursing, an even greater motivation is to maintain National League for Nursing (NLN) accreditation.

A requirement for licensure as an RN is graduation from an approved or accredited program, with the NLN accrediting the majority of nursing schools. In January, 1989, a resolution was delivered to the NLN Accreditation Committee which recommended that accreditation criteria include the integration of computer technology and nursing informatics in nursing curricula. The school that does not comply with this criteria is at risk of losing its accreditation status. The integration of educational technology throughout a nursing curriculum encourages computer competence. Frequent use of a computer promotes the perception of the computer as an everyday tool that has many valuable uses.

Need To Accommodate Students Admitted Through Lowered Admission Criteria

While many schools of nursing can maintain their allotted enrollment, some schools have been forced to lower their admission standards or close their doors. To keep their classrooms full, some are admitting students with less than the typical minimum SAT score of 800. The educationally disadvantaged student or one with less ability can benefit from the use of computerized learning materials. In her meta-analysis of research studies on the use of CAI at the college level, M.D. Roblyer reported that such students show higher gains in achievement with the use of CAI than do the majority of students. Interactive videodisc may prove particularly helpful in

equalizing learning achievements among students, because of its flexibility and repetition features.

Use of CAI for Remediation.

Today's best selling CAI programs provide remediation for the almost pandemic lack of math skills among beginning nursing students. Faculty would like to find ways of removing these and other remediation tasks from a curriculum that is already over-packed. Interactive videodisc programs can be used as independent study programs to bring all nursing students up to standard.

Need To Accelerate RN to BSN Status

RNs, educated in diploma and ADN programs, are returning to school for baccalaureate educations in record numbers. Because of the present shortage, schools of nursing are encouraged to accelerate their students education and return these much needed nurses to the work force.

Table 5.1: Growth of RN Student Enrollment in BSN Programs 1978 - 1987

	1978	1982	1985	1987
Total	25,437	35,662	42,940	46,375
Part-Time		28177	32,079	21,865

The increased demand for nurses with advanced degrees and the likelihood of legislation making the baccalaureate degree the level of entry into professional nursing practice are the powerful stimuli sending RNs back to school. The dramatic increase in full-time school attendance has depleted the number of nurses available for full-time employment. The rapid return of these nearly 50,000 nurses employment is essential.

Needs of RN Students

Surveyed RN students have stated that the traditional baccalaureate program with its repetitious knowledge and skill requirements is not relevant to their learning needs, frustrating, and a waste of time. Many of these students have been in practice for many years (42 percent are at least 36 years of age) and should be granted academic credit for their knowledge and experience.

The use of interactive videodisc programs can hasten the return of these nurses in at least three ways. Learning time is accelerated with the use of computer-

ized instruction, videodisc simulations can be used to grant academic credit for existing knowledge and clinical competence, and well-designed interactive videodisc programs provide flexibility and individualized learning and thus reduce redundancy.

Need To Accelerate LVN to RN Status

In recent years, the trend has been to have all-RN staffed hospitals. The argument is that all-RN staffs are more cost-effective. As a result, many LVNs were laid off from their positions in hospitals. These LVNs are returning to school to upgrade their status to RN and return to hospital employment. The use of computerized learning materials to accelerate the learning time for LVNs who are earning ADN or BSN degrees is a valid application. Interactive video programs could help to quickly return well-educated nurses to relieve the shortage of RNs.

Because of the nursing shortage, any action that will accelerate the filling of RN vacancies in the work force is being considered. With its ability to decrease learning time, the usefulness of computerized simulations to grant academic credit, and its flexibility of presentation that can reduce redundancy, interactive videodisc technology can be a major factor in solving problems created by the nursing shortage.

Use of Computerized Clinical Simulations to Validate Knowledge and Experience

The use of interactive videodisc simulations can decrease the time necessary to achieve a baccalaureate degree and also decrease redundancy experienced RNs when used as a test to validate RN student knowledge and experience. Many BSN programs designed specifically for returning RNs validate and offer academic credit for knowledge and clinical competency using various methods of testing.

A frequently used method is observation of the student in a clinical practice setting. The problems with this method include lack of standardization and objectivity, the possibility of observer bias, the introduction of unintended distractors, and poor student performance due to the anxiety of being observed and tested.

Instead of real-life practice, some schools ask the student to demonstrate their expertise by ministering to a mannequin in the nursing skills lab—a more controlled method but one with the same reliability problems. Other schools use a paper and pencil test such as the Nurse Mobility Profile. This method provides standardization but lacks realism. The use of computerized patient care simulations is an ideal solution.

Computerized patient care simulations were first employed at the Ohio State University School of Nursing beginning in 1981 to validate knowledge and clinical decision-making skills. To prove their knowledge and skill, RN students could choose to be tested from among 25 patient care simulations written on the school's mainframe computer. Included among the 25 simulations were representative medical-surgical, pediatric, obstetrical, and psychiatric patient care scenarios. RNs who achieved passing scores were granted credit and released from classes and clinical experiences in the areas of demonstrated expertise, thus reducing redundancy and time investment.

Because DRG implementation has resulted in the decreased availability of appropriate patient care experiences for student nurses, interactive videodisc programs can provide opportunities not only for simulated experiences that were once available in the hospital, but for simulated care of patients in out-patient centers, nursing homes, and in patient's home; experience that have become essential but not globally available.

Before the implementation of DRGs, students were assigned the care of medical-surgical unit patients who were hospitalized for minor surgery, diagnostic procedures, and regulation of medication. As their expertise grew, the students were assigned to care for patients with progressively more complex problems. Today, minor surgery, diagnostic procedures, and medical therapies are performed on an out-patient basis. Only very ill patients with complex problems are found in hospitals today. Patients on the medical-surgical units, once populated with patients who could be adequately cared for by novice students, now are those who would have been cared for in critical care units before the onset of DRGs. As a result, the easy transition from simple to complex patient care learning experiences has been thwarted.

Interactive Video to Provide Patient Care Experiences

The most outstanding value of interactive videodisc technology for nursing education is its ability to provide life-like patient care simulations. More computerized simulations are sold than any other type of CAI. Interactive videodisc simulations are most desired and judged the most efficient use of the technology in nursing education. CAI simulations are the most frequently used in schools of nursing.

Problems Encountered With the Use of Computerized Simulations for Testing

While it seems an ideal solution, there are at least four potential problems in using computerized simulations, including interactive videodisc simulations, for testing clinical competency: 1) test security, 2) maintenance of a cueless environment, 3) scoring, and 4) presenting unintended visual cues.

Security. While the use of computerized simulations at Ohio State accomplished the intended objective, by 1984 it became apparent to the faculty that for security reasons the same simulations could not be used repeatedly. While the test on a computer cannot be carried away as a test on paper can, information about content can be carried away in the memories of test-takers and then shared. Because visual scenarios are especially memorable, test security could be a problem with interactive video.

Cueless Environment. To be a true indicator of competency, the testing method should not give the testee cues to the correct answers. Most of the patient care simulations on the market today utilize multiple-choice formats and provide lists of options from which the user makes selections. These formats supply cues that may not have been thought of by the user. To be a valid measure of knowledge and ability, a simulation used for testing should be cueless. It has been determined that the NCLEX Computerized Simulation Testing programs will use an uncued, free-response approach to provide a better estimation of the RN candidates' ability. Because these simulations will not provide lists of options from which to select an answer, the simulations must be capable of responding to all possible entries made by the test-taker. A lack of standardization in the nursing terminology that may be entered by test-takers across the country has seriously delayed development of these simulations.

Scoring. The lack of standardized nursing terminology contributed to difficulties in establishing a reliable simulation scoring system. Dr. Shirley Dooling, Dean of the Creighton University School of Nursing in Omaha, Nebraska began evaluating the use of the cueless computerized simulation as a tool to measure clinical competency in 1975. She discovered during beta testing that students from different schools used different terms to describe nursing actions and decisions. The lack of consistency in their responses made scoring very difficult.

Unintended Visual Cues. Dr. Dooling also found that when video was added to the patient care simulations, students saw patient cues in the video that were not intended. For example, upon observation of a patient's body language in the video,

students believed the subject was experiencing pain. The patient's body language was not an intended cue, and thus the assessments and decisions made by the students were not congruent with the correct answers established by the simulation's author.

Preparing for a Computerized RN Licensure Examination

Today's first year student in a BSN program will be among the first to experience a computerized licensing examination. Within the next decade, the examination will include videodisc technology. Lack of computer comfort, competence, and confidence could cause a licensure candidate to fail the examination. Data reported by the National Board of Medical Examiners (NBME) following a test of its computerized physician licensure examination indicated that a true estimate of a candidate's knowledge and skill is not possible without computer experience.

In light of the recent increase in NCLEX failure rates, schools of nursing are being pressured to make changes in their curricula that will improve the passing rate of their graduates. The use of interactive videodisc technology can prepare the nursing student not only for the computerized NCLEX that will be implemented in 1992, but also for the examination when it is expanded to include clinical simulations incorporating videodisc technology (CST).

Computer Adaptive Testing (CAT)

The computerized NCLEX that will be in place by 1992 incorporates CAT (Computer Adaptive Testing) methodology, making each examination unique for each examinee. The computer program chooses questions from a pool of multiple-choice test items based on the examinee's previous answers. As each question is answered, the mathematical probability of competence is measured. When a minimum level has been established with a known degree of confidence, the examination is terminated. What results is a more precise measurement of each examinee's competency, and a shortened testing time for many since fewer questions are needed to determine competence levels that are far above or far below minimum competence.

Clinical Simulation Testing (CST) Incorporating Videodisc Technology

Computerized clinical simulations for NCLEX that incorporate videodisc technology are now in development. The \$1.86 million Kellogg funded project to develop and test computerized clinical simulations is built on the work done by the National Board of Medical Examiners (NBME). The simulations will be incorporated in the NCLEX to test nursing judgment and clinical decision-making skills. The first 24 simulations now under development are scheduled for testing in early 1990.

Chapter 6

Videodisc Hardware Systems

Move Toward Standardization

There seems to be a consensus evolving in the industry regarding hardware standards. Vendors today are going one of two routes: either marketing their programs on an inexpensive, proprietary, dedicated videodisc system, or developing them to run on what is quickly becoming the industry standard, the IBM InfoWindow or compatibles. A few vendors are doing both.

In the past, hardware systems have been one of the biggest problems faced by software vendors. Compatibility was a concern because buyers hesitated to purchase a non-standard system on which other commercial programs would not play. Today, this problem is being alleviated by the emergence of a dominate standard.

Integrated Hardware Systems — The InfoWindow Standard

Integrated systems are hardware units where all components are sold together as a package: computer, videodisc player, monitor, graphic overlay, touchscreen, etc. Two main advantages of this type of system are the assurance that all components will work together and the fact that there is usually only one dealer to call if anything fails to operate. Some examples of integrated systems are the IBM InfoWindow, Sony View, Visage V:Station, and the Comsell Learning Center.

Until the introduction of the IBM InfoWindow, there was no standard hardware configuration in the industry. Now it appears that the InfoWindow is quickly becoming the standard, with other configurations dominating a few specialized industry niches. This fact was supported as far back as 1987 by a hardware compatibility survey commissioned by the Instructional Systems Association and conducted by Future Systems, Inc., publishers of *The Videodisc Monitor* newsletter. When asked what hardware configurations they supported, videodisc developers indicated a strong swing toward the IBM InfoWindow for future development efforts.

Table 6.1 Hardware Targeted in Software Development Efforts – 1987

System	1987	Planned
IBM InfoWindow	18	17
Sony View	17	9
Visage	13	6

Other systems included ITS, Comsell, EIDS, NCR, Online, etc.

InfoWindow Emulation by FITNE, Sony, Visage

In the nursing segment, this trend also is evident by the fact that virtually every available software program is designed to play on the IBM InfoWindow. This fact has led other hardware vendors to develop software that will allow their videodisc systems to emulate the InfoWindow and therefore play InfoWindow courseware.

IBM InfoWindow

IBM introduced the InfoWindow videodisc system in July 1986. Instead of housing the control boards in the computer, IBM choose to put them in the monitor. Nonetheless, an enhanced graphic adapter card and a special EGA Jumper Card must be installed in the host computer.

The InfoWindow touchscreen measures eight inches by 11 inches and features up to 60 touch spots. A digital RGB signal from the computer can be superimposed over video from the videodisc, with up to 16 colors available from a selection of 64 colors. The system supports both Pioneer and Sony videodisc players and lists for approximately \$11,000.

The FITNE Interactive Video System

Designed specifically for the needs of nursing education, the FITNE Interactive Video System was introduced in October, 1988. The system consists of an IBM-AT compatible, 8 MHZ-80286 microcomputer with 640K RAM, one 5.25-inch floppy and one 20 MB hard disk drive, an audio system with speaker and two headphone jacks, a Microkey/Mark 10 EGA compatible graphics overlay board, a Mitsubishi 14-inch color monitor with auto-switching between EGA and CGA graphics modes and Elographics Intellitouch Screen, and a Pioneer LDV-4200 laserdisc player.

The system comes configured for InfoWindow emulation. Because the disk drives are 5.25-inch and DOS 3.3 is installed, the system also will run all of the CAI software available for nursing education. Should a system fail, FITNE ships a replacement while the original is being repaired. The system lists for \$7,349

Sony VIEW System

In February, 1989, Sony Corporation announced the introduction of its newest interactive videodisc system, the VIW-5000. The most notable features of the 5000 are its integrated computer and videodisc player as well as its InfoWindow compatibility. The system, equipped with one 3.5-inch disk drive, multiscan touchscreen monitor, and a 40Mb hard disk, lists near \$8,000.

In addition to InfoWindow emulation, the 5000 provides CGA, EGA, and VGA graphics compatibility, advanced graphics capability with 256 simultaneous colors at 640 x 480 resolution, and a flicker-free non-interlace display. The computer is a 286 compatible running at 8MHz or 10MHz with 640K main memory, 256 standard graphics memory, and a 3.5-inch floppy disk drive.

Visage System

Visage, Inc., of Framingham, Massachusetts announced in November 1989 the development of their InfoWindow-compatible videodisc system. The system is built around an Everex STEP-286 12 MHz computer with one MB RAM, 40MB hard disk drive, 5.25-inch floppy disk drive, and eight expansion slots. The system also comes with an EGA graphic overlay board (VGA available), multisync monitor with integrated touchscreen, cables, operating software, and a Sony LDP-1200 videodisc player. The Visage system lists for more than \$8,000, but was introduced at \$5,995, including a one-year warranty.

Proprietary Systems

In some instances, a company may want to forgo industry compatibility and offer a proprietary hardware delivery system with its courseware. In 1987, four new entries into the healthcare videodisc market offered proprietary dedicated systems. The main advantage of offering a dedicated, custom-built videodisc systems is that it is inexpensive — as low as \$1,500. This low price makes it easier for a vendor to market a program or series of programs. The drawback of such a system is that the user can not play videodisc courseware "off the shelf" from other vendors and is limited to one source for a library of videodisc programs.

Non-standard, dedicated systems probably work best in environments where there is a specialized need that can be supplied from a single source. In most cases, the vendor also offers InfoWindow versions of the same courseware to assure a broad market. Vendors which introduced dedicated systems in 1987 include Applied Interactive Technology (nursing education), Professional Training Systems (nurse assistant training in nursing homes), and Veritech Corporation (orthopedics).

Installed Videodisc Hardware Base

In 1977, when the first microcomputers entered the marketplace, purchasers were hobbyists. Software, run from cassettes, was made up mostly of games. It was not until 1979 when *VisiCalc*, the electronic spreadsheet with its "what-if" ability, came to market that the microcomputer was seen as a tool with value. Nothing like *VisiCalc* existed on any computer previously, but it was an immediate success. By 1981, it was shipping 12,000 copies. To have the advantages offered by *VisiCalc*, hardware was needed to run it, and sales of computers increased dramatically.

1987 — Schools of Nursing

Unlike the businessman who saw no value in owning a microcomputer before *VisiCalc* appeared, nurse educators, have purchased interactive videodisc hardware and have been actively seeking appropriate software for the past three years. In the 1987 SREB survey of 1,301 ADN and BSN schools of nursing across the country, 14 schools reported using interactive videodisc programs — in spite of the fact that the programs available at that time were not perceived as being specific for the needs of nursing school students.

A year later, in the 1988 SREB survey, while there was no increase in the number of schools reporting the use of interactive videodisc, more than 25 percent

of the respondents believed that computers were being used "to some extent" with interactive videodisc technology — a response that could be construed as wishful thinking.

1988 AJN Survey: Schools and Hospitals

Perhaps out of frustration, institutions began developing interactive video themselves. A February, 1988 survey by the American Journal of Nursing Company revealed that of the 75 (11 percent) respondents who were using interactive video, 35 were using programs developed in their own institutions and 17 were in the process of developing their own software. Only 5.3 percent of the 661 respondents said they were not interested in interactive video. Survey respondents included deans and directors of schools of nursing, directors of learning laboratories and librarians, hospital education directors, nursing instructors, directors of nursing, staff nurses and computer specialists in business and industry

1988 — IBM InfoWindow in Schools of Nursing

In early 1988, 16 of the first 80 members of the Fuld Institute for Technology in Nursing Education (FITNE) reported ownership of interactive videodisc hardware. Of these, only four owned IBM InfoWindow Systems. The remaining owned a variety of systems including the Sony View System and generic combinations or two-screen systems.

The paucity of InfoWindow hardware in schools of nursing at this time can be explained somewhat by a report in the June, 1988 *Videodisc Monitor*, which stated that InfoWindow Systems had been installed in only 100 community colleges, colleges, and universities nationwide. In April, 1989, an IBM spokesperson agreed that InfoWindow systems have been installed in fewer than 10 percent of IBM's higher education accounts.

1989 — IBM InfoWindow in Schools of Nursing

By September, 1989, however, 25 FITNE member schools of nursing reported they owned IBM InfoWindow Systems, a strong indicator of nursing's keen interest in interactive videodisc technology. These 25 schools, who may or may not be the only schools of nursing to own InfoWindows, represent a remarkable display of interest, considering the scarcity of available programs specific for nursing.

1989 — FITNE Systems Installed

By September, 1989, 86 schools of nursing owned 161 FITNE Interactive Videodisc Systems, not including an additional 14 schools which had placed orders. The large infusion of FITNE Systems came from a special grant by the Helene Fuld Health Trust. As a stimulus for the development of interactive videodisc programs specific for nursing education, the Trust advanced \$500,000 seed monies to FITNE to develop and install interactive videodisc systems in schools of nursing.

Of the 86 schools with FITNE systems, 46 received the systems free of charge as designated FITNE Interactive Video Demonstration Project Centers. Using the Helene Fuld Health Trust seed monies, a total of 77 FITNE Interactive Video Systems were installed at these demonstration centers in 42 states and Canada. In exchange for the free systems, each school agreed to participate in research projects that will validate the effectiveness of interactive video for nursing education. A copy of FITNE's videodisc program *Intravenous Therapy* was included with the hardware. Data collection on its use and effectiveness has begun.

1989 — Videodisc Systems Installed in 154 Schools

The total 126 schools of nursing known to have installed interactive videodisc systems was derived from the known 95 FITNE member schools which own the hardware, plus 15 schools which are not FITNE members and which have purchased the AJN interactive videodisc program. It is unknown how many of the 14 ADN and BSN schools identified in the SREB surveys can be counted among the FITNE members and AJN program purchasers. When the 14 schools which have ordered FITNE Interactive Video systems are added, it is possible that by November, 1989 as many as 154 schools of nursing will own interactive videodisc hardware — 9.4 percent of the 1,642 schools of nursing.

Table 6.2: Interactive Videodisc Systems Installed in Schools of Nursing

	InfoWindows Installed (FITNE Mem) # of Schools	FITNE Systems Installed # of Schools	# Schools w/ InfoWindow (not FITNE Mem) # of Schools	Total # Schools w/ Systems Installed
Nov., 1987				14
April, 1988	4			16
Sept, 1989	25	86	15	126

Each year, the Helene Fuld Health Trust awards at least \$4.2 million to schools of nursing. In April, 1989, \$1,355,000 was awarded for the purchase of interactive videodisc hardware and software. Included in the grant proposals of the schools that received these monies was the intent to purchase a minimum of 50 interactive videodisc systems. Before the end of 1989, at least 50 more interactive videodisc systems will be purchased.

Projected Penetration of Interactive Videodisc Hardware

Schools of Nursing — 89 Percent by 1998

In 1982, seven percent of the schools of nursing had microcomputers available for nursing education. By 1985, three years later, 53 percent had microcomputers, and by 1988, 71 percent of all US schools of nursing had microcomputers installed. This represents a compound growth rate of 10.0 percent

Installed Interactive Videodisc Systems

In 1987, there were at least 14 schools that owned interactive videodisc systems. By September 1989, two years later, there were 124 schools known to have interactive videodisc systems; a growth of more than 700 percent in two years. Due in large part to the \$1,355,000 in grant monies awarded by the Helene Fuld Health Trust in April 1989 for the purchase of interactive videodisc hardware and software, before the end of 1989 an additional 50 interactive videodisc systems will be purchased by schools of nursing. These purchases will increase the total number of schools owning interactive videodisc hardware in 1989, and will significantly increase the growth rate.

Assuming the rate interactive videodisc hardware installation will follow the same pattern of microcomputer acquisition, in the year 1998, 1461 (89 percent) schools of nursing will own interactive videodisc hardware.

Graph 6.3: Pattern of Microcomputer and Videodisc Penetration in Schools of Nursing, 1988 to 1998

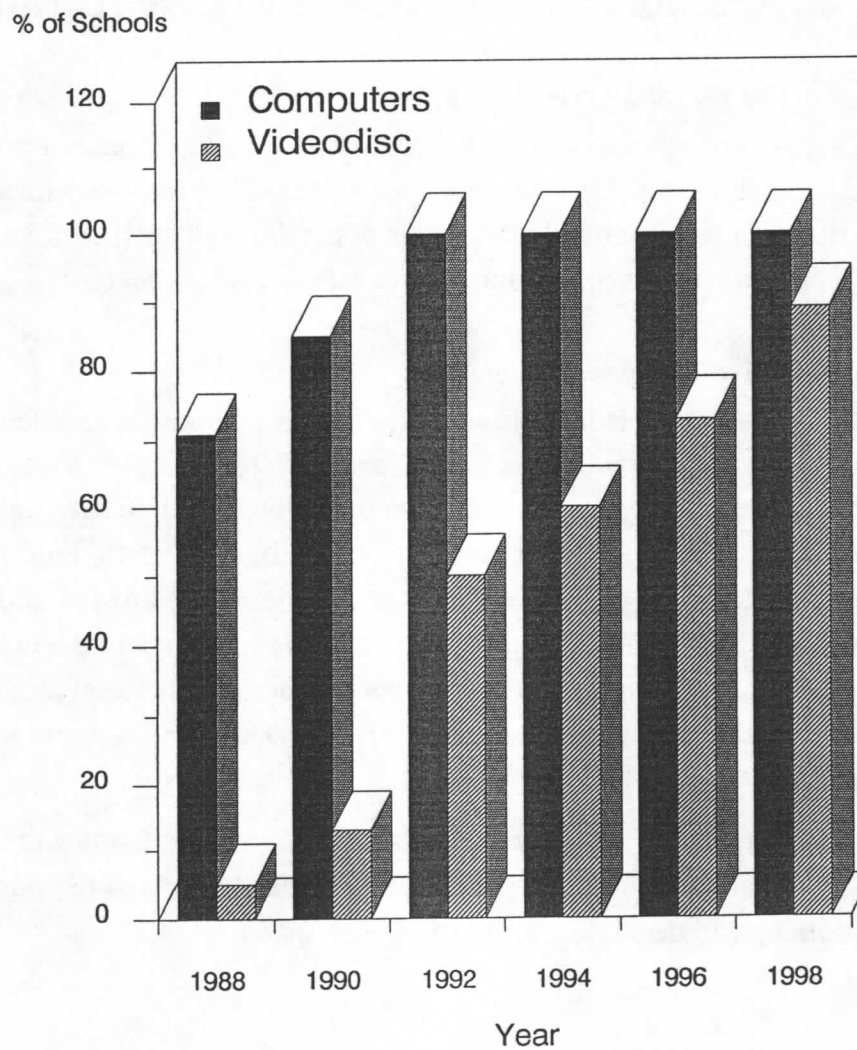


Table 6.3: Pattern of Microcomputer Penetration and Projected Interactive Videodisc Penetration in Schools of Nursing, 1982 to 1998

Year	Micros	IVD
1982	7%	
1985	53%	
1986	58%	
1987	64%	
1988	71%	5%
1989	78%	9%
1990	85%	13%
1991	94%	26%
1992	100%	50%
1993		55%
1994		60%
1995		67%
1996		73%
1997		81%
1998		89%

Source: Bolwell, 1989

Hospitals — 55 Percent by 1998

In 1982, none of the education departments in 5,783 community hospitals owned microcomputers. By 1985, 31 percent of the hospitals with more than 100 beds (3,159) were using microcomputers for educational purposes, and an additional 59 percent had definite plans to purchase microcomputers within the following two years. This represents a compound growth rate of 10.0 percent. At this rate, it is projected that by 1998 education departments in all hospitals with more than 100 beds will own microcomputers.

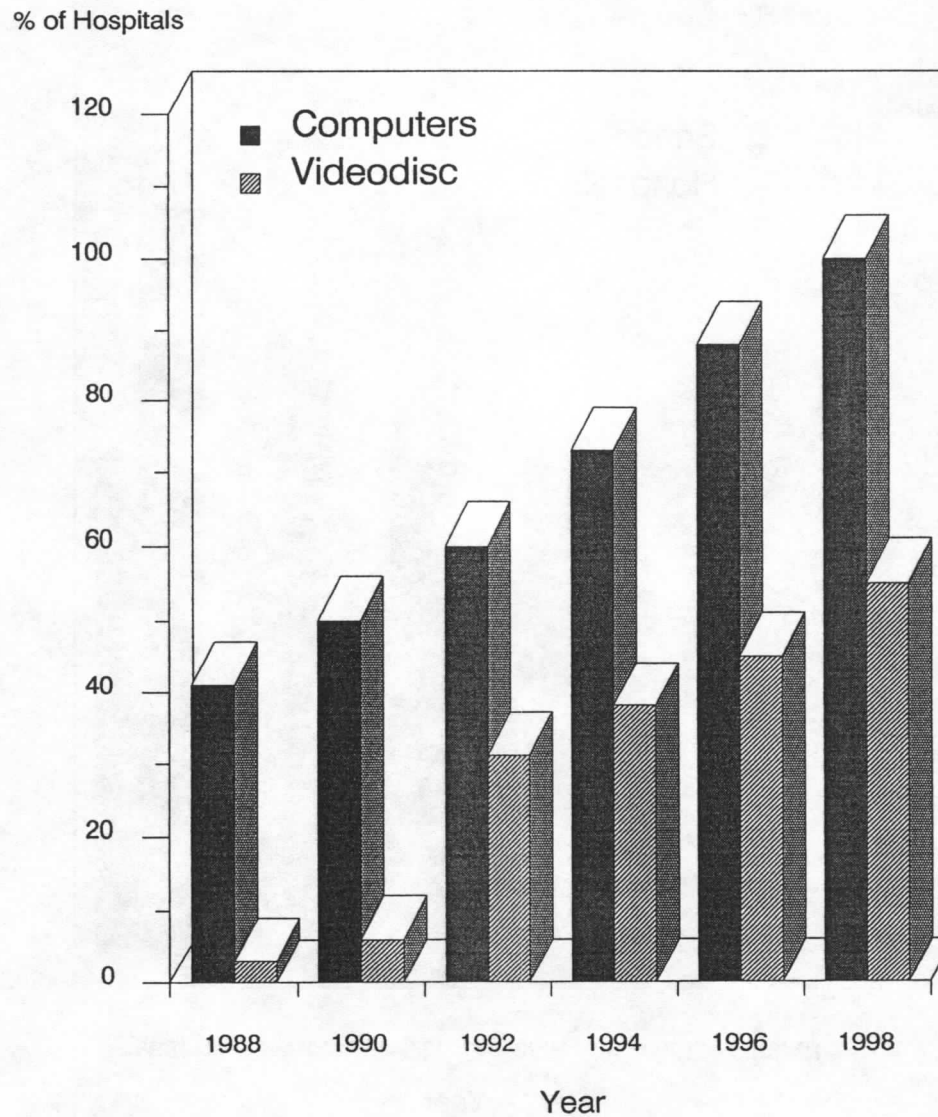
The rate of interactive videodisc hardware installation in hospitals should occur at the same rate as their acquisition of microcomputers. In 1988, it is estimated that less than 10 hospital education departments owned interactive videodisc hardware. Based on a compound growth rate that equates with the acquisition of microcomputers, by 1994, 38 percent or 1,200 hospitals with more than 100 beds will own interactive videodisc hardware. By 1998, at the same compound growth rate, it is estimated that 1,737, or 55 percent will have interactive videodisc hardware installed.

Table 6.4: Pattern of Microcomputer Penetration and Projected Interactive Videodisc Penetration in Community Hospitals, 1985 to 1998

Year	Micros	IVD
1985	31%	
1986	34%	
1987	38%	
1988	41%	
1989	45%	3%
1990	50%	6%
1991	55%	14%
1992	60%	31%
1993	66%	34%
1994	73%	38%
1995	80%	41%
1996	88%	45%
1997	97%	50%
1998	100%	55%

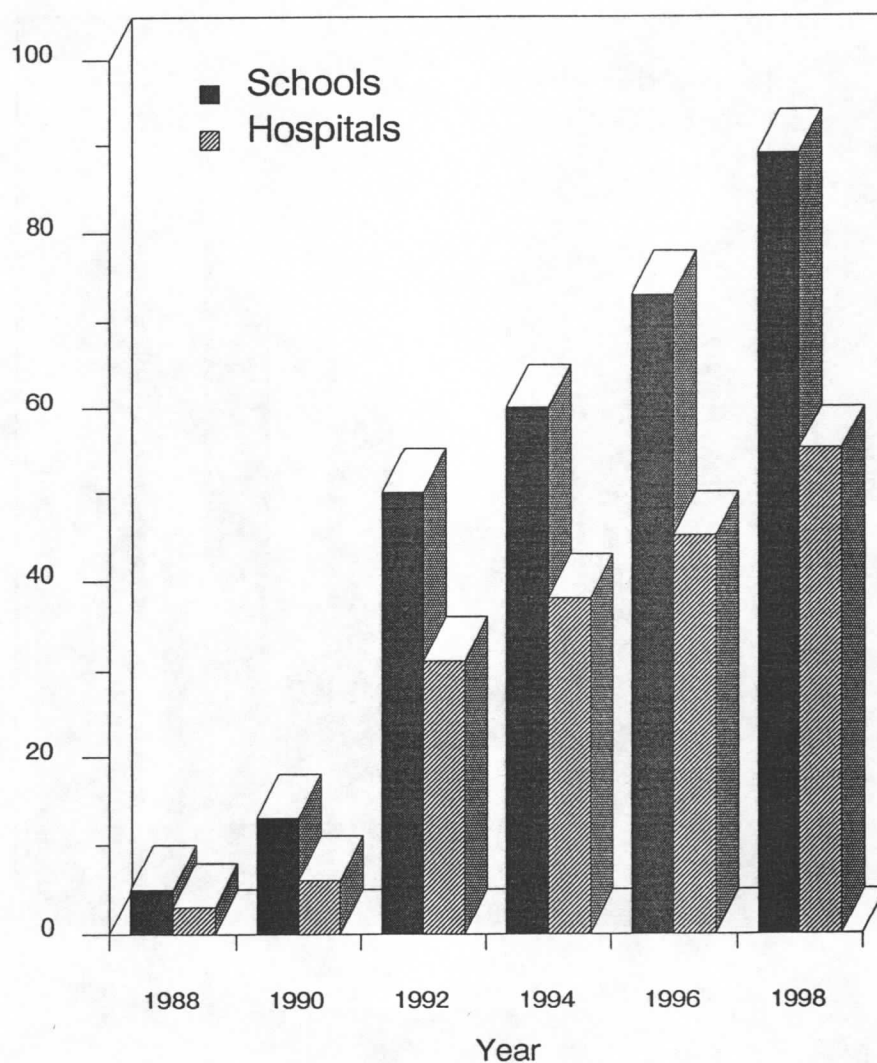
Source: Bolwell, 1989.

Graph 6.4: Pattern of Microcomputer and Videodisc Penetration in Community Hospitals, 1988-1998



Graph 6.5: Pattern of Interactive Videodisc Penetration in Schools and Hospitals, 1988-1998

% of Schools/Hospitals



Chapter 7

Interactive Videodisc Software

Commercial Videodisc Development

Actronics, Inc.

Actronics was the first commercial company to be formed for the purpose of developing and marketing health-related videodisc programs. Under license to the American Heart Association, Actronics was formed in 1983 to market the well-known CPR system developed by David Hon when he was National Training Manager at the AHA.

The CPR/ACLS Learning System consists of an Apple IIe computer, Sony or Pioneer videodisc player, a random-access audio cassette players, and electronic manikins which are interfaced with the computer. This dedicated system sells for \$12,895, with programs that range in cost from \$8500 for *CPR* to \$995 for *AIDS Information*.

Sales of the CPR/ACLS Learning System has reached approximately 300 units at 250 locations, with sales being slowed by problems common to all videodisc hardware vendors. However, former Actronics Vice Chairman Danny Cassidy, M.D., reported at the 1987 Washington Videodisc Conference that sales increased as the result of new marketing efforts outside the hospital community. Apparently, many of the barriers to sales found in hospitals do not exist in corporate and industrial settings. (*See Appendix A for complete text of this presentation.*)

CPR

The CPR course presents adult, infant and child material in accordance with the latest standards of the American Heart Association. The CPR lecture derives from a combination of video from the videodisc and computer-generated graphics. Drawings, cartoons, and video enhance understanding of the concepts and provide interest. You can move forward quickly to by-pass information that is known, back-up to review, or access reference banks.

Psychomotor practice and testing is accomplished through the sensorized manikins. As you move through the AHA procedures for single rescuer, two rescuer, obstructed airway, infant CPR and infant obstructed airway, the manikin sensors check your performance. They can, for example, detect the proximity of your face as you check for breathing, detect your call for help, and monitor your performance accuracy as you tilt the head, deliver breaths, and compressions. When an incorrect number and depth of ventilations are detected, your performance is corrected by an "instructor" projected on the video screen, who coaches you through the proper procedures. The manikin sensors detect hand-position, number, and quality of compressions. Your performance is displayed graphically on one screen with voice and visual feedback from the "instructor" on the other screen.

The multiple-choice test is administered by the computer. You select your answers with the light pen. The system scores the test and gives you immediate results. The scores and detailed results are saved on the disk and can be printed for certification.

While the AHA recommends a passing level of 90% for certification, you can set the CPR training standards to as low as 70% so that the System will allow a larger percentage of errors (none fatal). After practicing at the lower level, you can build confidence and performance skill to eventually reach the 90% goal.

Airway Management

This course includes and expands on the AHA ACLS (Advanced Cardiac Life Support) text of core materials. All aspects of airway management from ventilation and oxygenation devices to airway adjuncts are covered. You can observe procedures and techniques as often as desired, and then practice on the sensorized intubation head. The manikin monitors the head position, pressure on the teeth, cricoid pressure, the presence of the tube in the trachea, esophagus, or mainstem bronchus, the volume of ventilation, and inflation of the tube's cuff.

Arrhythmia Recognition

This program presents both the AHA ACLS core material and optional material. You can choose ECG Lessons, Therapeutic Modalities, or Static Recognition Practice and Testing. In the ECG Lessons section, each arrhythmia lesson includes a clinical situation, a formal definition of the arrhythmia, its specific characteristics, 5 static examples, one dynamic example, the therapeutic treatment, and a multiple choice quiz. In the Therapeutic Modality section, you can practice treating cardiac problems using the AHA protocols. Randomly selected case scenarios and rhythm strips are presented. You can order intubation, IVs, medications, defibrillation, cardioversion or pacing from a menu of selections. In the practice mode, remediation is given when errors are made. You can check the reference banks on drugs, AHA algorithms, and arrhythmias. In the testing mode you are given 35 minutes to complete a test that incorporates utilization of 6 or 7 AHA algorithms. The test administrator can set the level of proficiency from 85% to 100%. For testing Static Recognition, you are presented with 20 randomly generated strips that you must identify within 10 minutes.

Circulatory Adjuncts and Resuscitation Pharmacology

The Circulatory Adjuncts course contains all of the core material from the AHA ACLS text, quizzes, reference banks, and both the "A" and "B" versions of the written post-test. You learn about the basic techniques of starting peripheral and central lines, invasive monitoring, patient defibrillation and cardioversion, external and transvenous pacing, and the use of mechanical heart-lung resuscitators. In a defibrillation exercise, you select the appropriate defibrillator settings based on a patient's history and rhythm strip. You also monitor the placement and pressure of defibrillator pads.

The pharmacology course contains all of the core material from the AHA ACLS text, reference banks, and both the "A" and "B" versions of the written post-test. You learn the indications, actions, contraindications, dosage and administration routes of the drugs most commonly used in resuscitation and the treatment of congestive heart failure and hemodynamic instability. Also included are the ACLS courses on Medicolegal Aspects of Resuscitation and Resuscitation of Infants and Children.

Both programs use graphics, animation, and video portrayals of medical procedures. The post-tests for both courses are in a computer-assisted instruction (CAI) format.

Megacode

In this course you put together all of your ACLS knowledge. This program contains four sections: ACLS In Perspective, Putting It All Together, The Acute MI, and Practice/Test. Before making decisions regarding the treatment of any one of the hundreds of cardiac emergency scenarios that are available, you can review the AHA treatment protocols, review material on acute MIs, CPR, and emergency cardiac care.

ACLS in Perspective presents a discussion about the evolution, current practice, and future prospects in the development of CPR and emergency cardiac care, as well as an overview of the goals and objectives of the AHA in conducting an ACLS course. Putting It All Together presents a review of the AHA treatment protocols for cardiac emergencies, and outlines the necessary leadership skills and treatment modalities recommended by the AHA for the management of an acute cardiac emergency. The Acute MI section presents a discussion of the evolution, pathophysiology and general treatment of acute myocardial infarction.

In the cardiac emergency simulation section, you play the role of the team leader in a cardiac emergency situation. You are given 25 minutes to successfully diagnose and treat a randomly selected patient scenario from among the hundreds of variations available on the disc. You begin with a patient who is either conscious or unconscious, with variations in heart rhythm and blood pressure. As you proceed with treating the rhythm and hemodynamic changes, problems such as the development of pneumothorax, poor blood gases, an infiltrated IV, or inadequate CPR techniques creep up randomly and must be recognized and corrected. You can request diagnostic studies such as chest x-rays, lab studies or 12 lead ECG as well as defibrillate, order medications, and intubation, or ask for a consult. As you treat the patient, you observe the team on the screen carry out your decisions, and you see the results in your patient. Your performance, decision making, and leadership skills are measured and reported. This course has been approved to use in ACLS testing by the AHA.

American Journal of Nursing

The AJN is the nation's largest nursing communications company, publishing seven professional journals. The company also provides educational material for nurses and other health professional through its Educational Services Division and Professional Seminars Division. These materials include multimedia instruction, videotape distribution, inservice education via satellite, seminars and conferences, and

a highly successful review course for students preparing for the nursing licensure examination.

In the spring of 1988, the AJN received a three-year Special Projects grant from the Nursing Education Branch, Division of Nursing, Public Health Service, Department of Health and Human Services. The grant provides for the development of three interactive videodiscs, the evaluation of these programs, and the dissemination of the results of the evaluation to the nursing community. The first of these programs is *Nursing Care of the Elderly Patient with COPD*.

Nursing Care of the Elderly Patient with Chronic Obstructive Pulmonary Disease

This program presents information about Martin Presley, a 73-year-old man with COPD and pneumonia. The user manages Mr. Presley's care from his emergency room admission through his stay in the ICU to his discharge. While managing Mr. Presley's care, the user can make the following diagnosis and therapeutic decisions: assess chest and lung sounds, interpret arterial blood gasses, select appropriate medications, evaluate lab results, monitor oxygen therapy, and teach Mr. Presley and his wife what they need to know about COPD. This course is approved for Continuing Education Credit.

Applied Interactive Technology

Applied Interactive Technologies, Inc. (AIT) of Jackson, Mississippi has also developed and is marketing a proprietary videodisc hardware system which makes use of a cartridge rather than a floppy diskette. The Interactive Video Machine (IVM) sells for \$1,500 and consists of a modified Pioneer LD-V4200 videodisc player and a customized compact keyboard/microprocessor with operating system and control logic developed by AIT. A monitor and other peripherals are available at additional cost.

AIT has converted a number of existing videodisc programs to operate on their IVM system. A second version of these programs also will run on the IBM InfoWindow. Each program sells for \$950 and comes with a printed workbook and the necessary program cartridges. The programs include the following titles:

Converted from Health Edutech: AIDS Information Program, Sexually Transmitted Diseases, Health Hazards in Healthcare, Electrical Safety, Fire Safety, Back Safety, and Infection Control;

Converted from the Children's Medical Services, Florida: Human Genetics for Nurses, Comprehensive Case Management of Spina Bifida, Case Management of

Cleft Lip and Palate, Renal Analysis, Grieving Clients and Families, Intervention in Child Abuse and Neglect, Pediatric Hematology, Pediatric Cardiovascular Defects, and Court Testimony and Documentation;

Converted from Alberta Vocational Centre: Urinary Catheterization and Sterile Techniques at the Bedside.

Renal Analysis

Originally funded by the Florida Department of Health and Rehabilitative Services, This lesson consists of approximately six hours of interactive computer-based training. The package contains one users guide, five lesson diskettes, and one videodisc. Approximately 28 minutes of video accompanies the lesson. Instruction is individualized and menu-driven.

Court Testimony and Documentation

This lesson covers 1) the legal system, 2) on-going documentation of child abuse and neglect, 3) pretrial preparation, and 4) guidelines for effective testimony. Approximately eight hours of interactive computer-based training with one users guide, eight lesson diskettes, and one videodisc. Approximately 28 minutes of video accompanies the lesson. Instruction is individualized and menu driven.

Pediatric Hematology

This lesson provides approximately eight hours of interactive computer-based training. Package contains one users guide, four lesson diskettes, and one videodisc. Approximately 15 minutes of video accompany the lesson. Instruction is individualized and menu driven.

Pediatric Cardiovascular Defects

This lesson provides a pediatric cardiovascular data base which cross-references the medical and psychosocial aspects of approximately 23 specific defects. Approximately eight hours of interactive computer-based training with one users guide, eight lesson diskettes, and one videodisc. Approximately 15 minutes of video accompany the lesson. Instruction is individualized and menu-driven.

Human Genetics Training For Nurses

This program provides approximately 20 minutes of dissociated motion segments and approximately 800 slides and graphics on genetic diseases and disorders,

chromosomal problems, pedigree, and nursing support roles combined on a one-sided videodisc. Menu-driven lessons are individualized under computer control.

Home Care of the Chronically Ill Child

Fives modules are included: 1) making the home visit, 2) preparing a child for home care procedures, 3) child health assessment (respiratory), 4) pediatric feeding techniques (NG tubes, gastrostomy tubes), and 5) pediatric apnea monitoring. The program consists of approximately six hours of instruction and includes print material, videodisc, and floppy diskette.

Case Management of Cleft Lip and Palate

This lesson includeds approximately ten hours of interactive computer-based training. Package contains one user's guide, six lesson diskettes, and one videodisc. Approximately 56 minutes of video accompanies the lesson. Instruction is individualized and menu driven.

Intervention In Child Abuse And Neglect

This lesson offers approximately six hours of interactive computer-based training. Package contains one users guide, six lesson diskettes, and one videodisc. Approximately 28 minutes of video accompanies the lesson. Instruction is individualized and menu driven.

Grieving Clients And Families

This lesson contains approximately eight hours of interactive computer-based training. Package contains one users guide, eight lesson diskettes, and one videodisc. Approximately 28 minutes of video accompanies the lesson. Instruction is individualized and menu driven.

Case Management Of Spina Bifida

This program describes general issues including medical psychosocial, and treatment/management of spina bifida. Approximately twenty minutes of dissociated motion segments and approximately eight hundred slides and graphics on spina bifida case management are combined on a one-sided videodisc. Menu-driven lessons are individualized under computer control.

Sterile Techniques At The Bedside

This videodisc demonstrates correct procedures for the preparation and changing of dressings while maintaining sterile conditions at the bedside. It is menu driven, with each instructional unit followed by multiple choice testing and remedial sequences. A support manual is provided.

Urinary Catheterization

This disc takes the student through the various steps necessary to perform a successful urinary catheterization. It is menu-driven, with each instructional unit followed by multiple choice testing and remedial sequences. The disc includes a segment providing instruction on how to use the videodisc player. A support manual is provided.

Artemis

The Birth Disc

Photographer and writer Harriette Hartigan has been photographing birth scenes for 13 years. Her collection was transferred to videodisc by the production group Image Premastering Services. The result is *The Birth Disc*, a visual database of 9,000 color and black and white photographs illustrating childbirth. This resource library documents the process of birth from pregnancy and labor, through birth itself, to the emerging newborn and the postpartum experience. A table of contents and a cross reference index helps the user locate specific images within 65 chapters and 43 case studies.

Fuld Institute for Technology in Nursing Education (FITNE)

The Helene Fuld Health Trust established the Fuld Institute for Technology in Nursing Education (FITNE) in October, 1987. The Institute is funded through a three-year contract between the Trust and Electronic Vision, Inc., of Athens, Ohio, an interactive communications company.

The Institute serves as an information clearinghouse on the use of computer technology in nursing education. In addition to providing a newsletter, electronic bulletin board, and workshops, FITNE is committed to delivering two interactive videodisc programs per year to the nursing community. The first program, *Intravenous Therapy*, originally was developed at Hocking Technical College.

Intravenous Therapy

This program provides in-depth, comprehensive instruction on how to prepare, start, monitor and discontinue intravenous infusions. It was developed for use in a nursing skills lab where students could practice skills while referring to the program for correction and reinforcement. During many of the video sequences, you can control the video playback by skipping or replaying segments, or viewing just one frame of video at a time. Quizzes are included in all chapters to let you know how well you understand the topic presented. Immediate feedback is given, but no scores are kept.

The program is divided into six chapters. In chapter 1, Intravenous Solutions, you learn the various components of intravenous solutions and the indications for their use. Chapter 2, Preparing the Solution and Tubing provides guidelines for the selection of solutions and tubing, and demonstrates how to prime tubing and time tape containers. In chapter 3, Starting the IV, you are introduced to the details in preparing and inserting the intravenous needle. Chapter 4, Regulating the IV, concentrates on the maintenance of an intravenous infusion including regulation and calculation of flow rate, performance of a systematic check, and the addition of solutions and tubing to existing infusions. In chapter 5, Discontinuing the IV, you learn how to remove an intravenous needle. Chapter 6, Complications, focuses on the usual causes, signs and management of common complications of intravenous therapy.

Health EduTech

Health EduTech, Inc. was formed in 1984 to develop educational, informational, and training programs using interactive video technology. The primary audiences for Health EduTech programs are the healthcare and educational markets. Secondary audiences include state, county, and municipal governments, private industry, and correctional facilities.

With the funds from a public sale of 250,000 shares of stock at \$2.00 per share, Health EduTech was able to complete production of and begin marketing *Hazards in the Workplace*, their first interactive videodisc training program. By April, 1985, development costs for the program were recovered with sales of the program to the Minnesota educational community which were complying to the Minnesota Employee Right to Know Act of 1983. Since then, Health EduTech has produced six Level II videodisc programs.

The *Health Care Orientation Series* includes programs on *Back Safety*, *Infection Control*, *Fire Safety*, and *Electrical Safety*. Also developed by Health EduTech is a Level II program on *AIDS* and one on *Sexually Transmitted Diseases*. Each of the programs sells for \$995. The following is a summary of each.

Infection Control

This program is divided into chapters which cover a variety of topics. For nursing employees, the program includes Culturing, Linen Handling, Invasive Therapy, Isolation Procedure, Patient in Isolation Transfer, Wound Care, Care of Equipment, and Handling of Waste. For housekeeping employees, the program includes Handwashing/Personal Hygiene, Isolation Procedure, Floors, Walls/Furniture, Beds/Mattress, Equipment, and Handling of Waste. For food service employees, the program includes Handwashing/Personal Hygiene, Storing Perishable and Non-Perishable Foods, Serving Foods, and Equipment Cleaning and Sanitization.

Back Safety

This program is designed to teach employees to 1) understand the structure of the back and how the back works, 2) use good body mechanics to prevent back injury, 3) explain basic principles of good body mechanics for lifting, pushing, reaching, and sitting, and 4) demonstrate the proper way to perform trunk and back exercises.

Intelligent Images, Inc.

In January, 1985, Intelligent Images, Inc. (III) began production on a series of patient simulations designed to provide continuing education to emergency medical personnel. Funded with venture capital, the project was the largest ever in the area of health-related videodisc production—with plans to produce 30 videodiscs, at a rate of two each month. Six programs were completed, with several others in various stages of development, when funds were depleted and production was suspended in December, 1985.

The series was written and produced under contract to III by the Human Resources Research Organization (HumRRO) in Alexandria, Virginia. The pilot program, *Shotgun Wound to the Abdomen* (Victor Mercedes), has received numerous awards, including "Best Educational Production" by the Nebraska Videodisc Design/Production Group, as well as the Leshner Award for "best and most innovative educational communications" at the John Muir Medical Film Festival.

How the Programs Work. The focus of the series is on the process of decision-making, rather than clinical procedures. In each disc the learner must manage a patient by selecting from a series of menus which provide diagnostic and therapeutic procedures, monitors, x-rays, medications, lab tests, fluids, and consultants. The unique feature of these lessons — making them true simulations — is that the results of each decision will vary from moment to moment depending on the patient's status at the time of decision, the prior decisions of the learner, and the passage of real and simulated time.

Patient data such as vital signs, ECGs, X-rays, and lab test results change constantly and depend upon treatment decisions. The computer keeps track of each decision and, at the conclusion of the lesson, provides feedback to the learner regarding key decision points as well as a cost-of-care analysis. Because some of the lessons are programmed with random complications, the learner may go through the same lesson several times without being able to predict the exact course the patient will take.

A Second Wind. When production was suspended, III released information stating that "initial sales efforts have shown that interactive videodiscs will become a well accepted training method in the future, but videodisc training is competing for hospital dollars normally associated with capital equipment acquisitions rather than training materials." The company temporarily shifted its focus and initiated "Test Market II" to clarify two areas of current concern: 1) the method of selling interactive videodisc system as a training system rather than as a capital expense and 2) the viability of additional topics within the marketplace that will broaden the market base.

In 1987, III merged with the R2 Corporation (a medical supply company) to form the DaRox Corporation. Currently, all of III's production and programming is being coordinated by its home office in San Diego, California. III managed to finish production on an additional two patient simulations, bringing the total to eight. The titles of the available programs are: *Abdominal Stab Wounds*, *Chest Trauma*, *A Patient With Diarrhea and Vomiting*, *Motor Vehicle Trauma*, *Diagnostic Decisions in Shock*, *Shotgun Wound to the Abdomen*, *Initial Assessment of Respiratory Difficulties*, and *Discontinuing Mechanical Ventilation*.

In addition, III has put together eight instructional programs to form the Nursing Assessment and Intervention Series. These programs are titled *Discontinuing Mechanical Ventilation*, *Pathophysiology of Cardiac Tamponade*, *Pathophysiology*

of Shock, Antishock Trousers, Central Venous Pressure, Chest Tubes, Auscultating Breath Sounds, IV Therapy, and IV Solutions.

Assessment & Intervention Series

Pathophysiology of Shock.

This program provides a look at the physiologic effects of shock and the body's compensatory responses to the syndrome. The lesson presents the key physiologic change common to all types of shock. The clinical features of hypovolemic, septic, anaphylactic, traumatic, and cardiogenic shock including signs and symptoms, hemodynamic changes and oxygen transport changes are given along with the specific treatment priorities. Case studies present a clinical picture consistent with shock types. You are asked to identify the shock in each case by its physiologic response.

Pathophysiology of Cardiac Tamponade

This tutorial provides three cases that demonstrate how the clinical syndrome presents itself and when to suspect tamponade. Given specific physiologic parameters, you anticipate changes in the patient's condition. Included is a discussion of the types of injuries likely to produce tamponade and descriptions of appropriate interventions and their rationale.

Central Venous Pressure

In this program, you find a definition of the CVP manometer and its four functions. You are shown how to give careful attention to the patency of the line, stopcock settings, positions of the zero point and physiologic factors that can alter the accurate assessment of the CVP reading. You are then given a simulated patient with vital signs and are asked to position the stopcock to take a CVP measurement. In a troubleshooting exercise, you encounter both low and falsely high CVP readings and must troubleshoot for procedural and system errors. Common mistakes in the measurement process are listed along with troubleshooting guidelines.

Antishock Trousers

This lesson defines the purpose and components of antishock trousers. You find a description of how to monitor and assess blood pressure, tissue perfusion, LOC, lower extremity pulses, and concurrent fluid resuscitation. You learn the dangers of suddenly removing the antishock trousers. Given a case study and a simu-

lated antishock trousers gauge, you must monitor and assess the patient while initiating the proper sequence for removal.

Auscultation of Normal Breath Sounds

This lesson reviews the standard procedures to auscultate the posterior and anterior chest. You review patient positions, breathing techniques and stethoscope placement. The three major components of the lesson are exercises designed to simulate a systematic chest examination, identify lung lobes, and identify bronchial, vesicular and bronchovesicular breath sounds.

Chest Tube Therapy

In this lesson, you review intrathoracic dynamics and physical dynamics of chest tubes. The primary emphasis is on ensuring proper tube function, recognizing and correcting problems with the drainage system. A major component of the lesson is an exercise designed to test application of the principles contained in the lesson.

IV Therapy

This lesson reviews the overall goals of IV therapy, with an emphasis on the management of hypovolemic shock. You learn the rationale for IV therapy, how to select an appropriate IV solution, flow rate, needle size and IV site, and learn how to calculate the correct drip rate for a given fluid volume order. The lesson is problem-oriented with a generous use of mini-case studies to test application.

IV Solutions

This lesson reviews the major types of IV solutions, including properties of both colloids and crystalloids. You learn the advantages and disadvantages of each solution and how to select an appropriate IV solution for a specific patient situation. You apply the information in mini-case studies.

Patient Simulation Series

Gun Shot Wound To The Abdomen

In this simulation, you make decisions regarding the emergency treatment of a 17-year-old brought in with a gun shot wound in the abdomen. You watch as the bleeding patient is wheeled into the ER, and the ER team is mobilized into action. You listen as the paramedics report on the events preceding the admission. You watch as the ER team begins to remove the patient's clothing and listen as the nurse

calls out the his blood pressure, pulse and respiratory rate. You are then asked what you would like to do next. The impact of whatever you select is shown immediately - for better or for worse. As the program evolves, it becomes evident what you have overlooked as complications occur or the patient's condition deteriorates. You must continue to make decisions to correct the problem. Serious mistakes or omissions can result in a code. As you move through the program, complications that typically occur are randomly introduced so that no two runs through the program are likely to be identical.

There are as many as 300 different choices available as you move through the program. You can order any type of fluids, blood, x-rays, lab tests, and EKG. The results are available to you in the same length of time it would take to get the results in real life.

At the completion of the simulation, you are given a summary of your performance. The evaluation includes a detailed account of the costs incurred. A consultant speaks with you about your successful handling of the case, or points out your mistakes. The simulation is summarized from the time the patient enters the ER until completion. You learn what was needed, what you did and what you did not do as you are shown the critical moments in the video.

Abdominal Stab Wounds

In this simulation, you make decisions regarding the emergency treatment of a young male with with multiple abdominal stab wounds. As the simulation opens, you see a quiet emergency room when the air is pierced by a radio call that a victim with multiple stab wounds is enroute. Seconds later the doors fly open, and a bleeding young man is wheeled in by paramedics. The ER team is mobilized into action, and you listen as the paramedics report on the events preceding their arrival. The nurse calls out the patient's blood pressure, pulse and respiratory rate, and you are asked what you would like to do next. The impact of whatever you select is shown immediately - for better or for worse. As the program evolves, it becomes evident what you have overlooked as complications occur or the patient's condition deteriorates. You must continue to make decisions to correct the problem. Serious mistakes or omissions can result in a cardiac arrest. As you move through the program, complications that typically occur are randomly introduced so that no two runs through the program are likely to be identical.

There are as many as 300 different choices available as you move through the program. You can order and type of fluids, blood, x-rays, lab tests, and EKG. The

results are available to you in the same length of time it would take to get the results in real life.

At the completion of the simulation, you are given a summary of your performance. The evaluation includes a detailed account of the costs incurred. A consultant speaks with you about your successful handling of the case, or harshly points out your mistakes. The simulation is summarized from the time the patient enters the ER until completion. You learn what was needed, what you did, and what you did not do as you are shown the critical moments in the video.

Chest Trauma

In this simulation, you make decisions regarding the emergency treatment of Eugene, who is wheeled into the ER 20 minutes after his motorcycle hit a car. You hear the sights and sounds of admission, watch as the ER team moves Eugene to the table. You hear the paramedics report of what they found at the scene, and that there is a lower leg fracture under the MAST trousers. You listen as the nurse calls out the patient's blood pressure, pulse and respiratory rate. You are then asked what you would like to do next. When you select clear airway, you watch as the physician listens to the chest, reports diminished breath sound on the right and listen as the nurse reports that his left pupil is larger than on the right and sluggishly reactive. You hear that Eugene has stopped breathing. You learn later, that this could have been prevented if you had ventilated him sooner. You order fluids to increase total volume, order chest x-rays, leg and skull x-rays. When you issue the order to intubate, you can select either an oral or nasotracheal tube and then watch as your order is carried out. If you do not order a mechanical ventilator, a nurse makes this suggestion, and if you do not order an x-ray to check the placement of the tube, you will have problems later because it is in the right main stem bronchus.

You can choose the lab tests you want such as ABGs, CBC, Hct, platelets, type and cross. If you want a urine specimen, you must order a foley inserted. After issuing your orders, you can look at the vital signs to see the impact of your decisions.

There are as many as 300 different choices available as you move through the program. At the completion of the simulation, you are given a summary of your performance. You can print out every decision you have made, the sequence of the decisions and the time of each decision. The evaluation also includes a detailed account of the costs incurred. Your costs are then compared with an expert clinician's costs. The simulation is summarized, by an expert, from the time the patient enters the ER until completion. You hear the expert report what was needed,

what you did and what you did not do, what was appropriate and what was inappropriate as you are shown the critical moments in the video.

A Patient With Diarrhea And Vomiting

In this simulation, you make decisions regarding the emergency treatment of a patient who arrives in the ER with flu-like complaints of vomiting and diarrhea. You make decisions about treating hypovolemic shock from dehydration and possible sepsis. In the course of your assessment, you must recognize the existence of shock and identify its cause, evaluate the severity of the shock, initiate the appropriate IV fluid replacement therapy, request the appropriate laboratory studies, and initiate the necessary drug therapy. The goal is to stabilize the patient prior to his transfer to the critical care unit

There are as many as 300 different choices available as you move through the program. At the completion of the simulation, you are given a summary of your performance. You can print out every decision you have made, the sequence of the decisions and the time of each decision. The evaluation also includes a detailed account of the costs incurred. Your costs are then compared with an expert clinician's costs. The simulation is summarized, by an expert, from the time the patient enters the ER until completion. You hear the expert report what was needed, what you did and what you did not do, what was appropriate and what was inappropriate as you are shown the critical moments in the video.

Diagnostic Decisions In A Patient In Shock

In this simulation, the challenge is in differential diagnosis. The patient arrives in the ER with general complaints, but over time they progress to suggest upper gastrointestinal bleeding and/or acute myocardial infarction. The program uses a diagnostic matrix so that you can prioritize possible diagnoses while initiating assessment and stabilization measures. You are required to appropriately modify your working diagnosis throughout the simulation, identify the cause of the patient's shock, prioritize stabilizing interventions, evaluate the adequacy of perfusion, initiate appropriate IV therapy, initiate monitoring measures specific to cardiogenic shock, request laboratory studies specific to cardiogenic shock, initiate appropriate drug therapy, and expedite transfer to ICU.

There are as many as 300 different choices available as you move through the program. At the completion of the simulation, you are given a summary of your performance. You can print out every decision you have made, the sequence of the decisions and the time of each decision. The evaluation also includes a detailed

account of the costs incurred. Your costs are then compared with an expert clinician's costs. The simulation is summarized, by an expert, from the time the patient enters the ER until completion. You hear the expert report what was needed, what you did and what you did not do, what was appropriate and what was inappropriate as you are shown the critical moments in the video.

Initial Assessment Of Respiratory Difficulty

This simulation takes place over a two day period in the intensive care unit. The patient, a passenger in a motor vehicle accident, has a lung contusion that requires the use of CPAP. You must make continued assessments and update your diagnoses and treatment plans. You make initial and ongoing respiratory assessments, initiate appropriate diagnostic and monitoring strategies, order laboratory tests including ABGs and pulmonary function tests, initiate, evaluate and adjust oxygen therapy, identify the need for mechanical ventilation, and formulate a treatment plan that goes beyond supportive care. As you make your decisions, you watch as they are carried out by critical care personnel and respiratory therapists. Should you initiate or omit appropriate measures, you must deal with the resulting changes in the patient's condition.

There are as many as 300 different choices available as you move through the program. At the completion of the simulation, you are given a summary of your performance. You can print out every decision you have made, the sequence of the decisions and the time of each decision. The evaluation also includes a detailed account of the costs incurred. Your costs are then compared with an expert clinician's costs. The simulation is summarized, by an expert, from the time the patient enters the ER until completion. You hear the expert report what was needed, what you did and what you did not do, what was appropriate and what was inappropriate as you are shown the critical moments in the video.

Discontinuing Mechanical Ventilation

In this simulation, you make decisions about weaning a patient from a mechanical ventilator. The patient has been in the ICU for a number of days and is ready to be weaned. You make decisions that follow safe weaning and extubation protocols. You must identify when the patient's respiratory functions are sufficiently adequate to discontinue mechanical ventilation, and recognize the patient's readiness to be extubated.

There are as many as 300 different choices available as you move through the program. At the completion of the simulation, you are given a summary of your per-

formance. You can print out every decision you have made, the sequence of the decisions and the time of each decision. The evaluation also includes a detailed account of the costs incurred. Your costs are then compared with an expert clinician's costs. The simulation is summarized, by an expert, from the time the patient enters the ER until completion. You hear the expert report what was needed, what you did and what you did not do, what was appropriate and what was inappropriate as you are shown the critical moments in the video.

Mirror Systems, Inc.

In 1987, Mirror Systems, Inc., a subsidiary of the Times Mirror publishing corporation, set out to demonstrate its ability to create an exemplary videodisc program in the area of cardiovascular examination. After investing what is believed to be more than \$250,000 in the project, the resulting program ultimately won three different awards, including the Nebraska Videodisc Award for Best Educational Program.

The program was to be distributed by another Times Mirror subsidiary, the medical publisher C.V. Mosby Company. However, little to no marketing was accomplished, and the disc has been distributed through limited efforts by Mirror Systems, the MDR Videodisc Consortium (MDRVC), and the Fuld Institute for Technology in Nursing Education (FITNE).

In December 1989, Mirror Systems announced that it will discontinue sales of *Introduction to Cardiovascular Examination*. The decision to discontinue sales of the program was due to the lack of a substantial installed base of compatible videodisc playback systems, together with continuing changes in the available videodisc hardware configurations.

Introduction To Cardiovascular Examination

This program provides two to four hours of instruction on the anatomy and physiology of the heart, auscultation of heart sounds, and abnormal heart sounds and murmurs. The content is presented at varying levels of difficulty. Cardiovascular procedures and concepts are presented through a combination of live video, computer graphic illustrations, two and three dimensional animation, and sound.

The course is divided into 3 main sections, Introduction, Units, and Final Test. When you select Units, you can choose from a submenu that includes Anatomy of the Heart, Physiology of the Heart, Auscultation of Normal Heart Sounds, and Extra Sounds and Murmurs. The anatomy and physiology portions are presented in colorful, computer-generated graphics that you control. To learn the basic

anatomy of the heart, you can touch each chamber of the heart on the screen to receive information about it. There are multiple levels of embedded information and you can choose as much or as little as desired.

You can choose your focus from among the learning activities in the Physiology section. For example, you can concentrate on learning the physiology of heart sounds first, or learn more about systole and diastole. After observing animated atria and ventricles contract and relax, and valves open and close while listening to a voice-over description and heart sounds, you can touch boxes on the right side of the screen to zero in on systole, diastole, S1 or S2, or you can review the entire cardiac cycle.

To learn the cardiovascular examination procedure, you first watch the procedure, listen to hear what the examiner hears, look at a graphic depiction of the underlying physiology of what you are hearing, and then test your knowledge by critiquing the performance of the examiner. You watch the examiner place his stethoscope on the chest of a patient, hear the heart sounds he hears, and then study a graphic depiction of what lies under the examiners stethoscope as you listen to the voice-over explain the 5 auscultatory areas. Each area is highlighted as it is explained. You can stop, start and repeat the examination, start and stop the heart sounds. To test your ability to recognize correctly performed examinations, you watch the examiner and then touch the screen when you notice a mistake. You are then asked to identify the mistake that was made.

In the Extra Sounds and Murmurs section, you can choose from an auditory data bank of abnormal heart sounds. For each sound and murmur, you can elect to hear and study discrete characteristics. You can choose to focus on the location, the pitch, the intensity, the timing, radiation, variation with respiration and/or quality. For each characteristic, you view an animated graphical depiction, hear a voice-over description, and listen to the sound.

To apply what you have learned, you watch and listen as an examiner places his stethoscope, listen to what the examiner hears, and then identify the heart sound. You then select the description of the heart sound or murmur you have just heard. You select a descriptor of timing from systolic, diastolic, or continuous. You select descriptions of quality from vibratory, blowing, musical or harsh. You can, at any time, choose to replay the auscultation, review information on timing or quality, or review carotid pulse.

You can check your score at any time. Scores for each unit completed are displayed. When you have completed your study, you are given suggestions for areas that need further study.

A unique feature of this program is the use of recorded live heart sounds instead of synthesized heart sounds. Sound footage of actual heart patients was obtained from the Texas Heart Institute. The sounds were digitized, filtered, processed and slowed down to synchronize them with video animation. Optional stethoscope headsets are available for listening to the heart sounds in a more realistic manner.

Professional Training Systems, Inc.

Professional Training Systems, Inc. of Atlanta, Georgia entered the healthcare market in the fall of 1987 with four new videodisc programs: *Understanding Aging*, *Care Basics for Nursing Assistants*, *On the Job Safeguards for AIDS*, and *An Ounce of Prevention*. Each program is part of the Pro-Vision interactive videodisc courseware series and will play on any major hardware system such as the IBM InfoWindow, Sony View, Visage, MCI, etc. Professional Training Systems also offers its own hardware configuration at a lower cost. The programs sell for \$1,500 and \$1,600 dollars each.

Understanding Aging

This program is a response to the growing need for people to understand the process of aging. The course, which can be completed in 1 to 2 hours, debunks myths about aging and older people, discusses the causes and effects of aging, defines key terms, addresses the physical changes that accompany aging, explains how normal aging affects a person's mind, examines how getting older affects a person's family and other social and work relationships, explores the impact of getting older on a person's financial situation, reviews how society responds to the needs of older persons and suggests improved ways for society, friends and family to respond to the needs of older people.

Prevention Of Occupational Exposure To The Aids Virus

This program is designed for health care workers, particularly nurses, who come into contact with blood and body fluids containing blood, and to meet the training and education requirement specified by OSHA. This 1 to 3 hour course includes a nonthreatening discussion of risk, modes of transmission, epidemiology, and universal precautions. It specifically addresses the correct procedures for needle dis-

posals, handwashing, handling specimens, resuscitation, handling spills, disinfecting and sterilizing equipment, cleaning surfaces and handling soiled linen.

An accompanying handbook summarizes material covered on the disc, provides updated information, and contains a glossary of terms and sources of additional information.

An Ounce Of Prevention: Recognition And Prevention Of Child Abuse And Neglect

This program is designed to equip child care program staff and directors with the skill to recognize and help prevent child abuse and neglect. The program, which takes approximately three hours to complete, includes video, color pictures, graphics, narration, music and text on the screen. Pictures of physical abuse are shown from actual cases. Graphics help convey concepts or deal with topics difficult to show in pictures, such as sexual abuse. The sequence of the course depends on your response. If a correct answer is selected, the program moves forward. If an incorrect answer is selected, you are given an opportunity to review the relevant information again. The program begins by emphasizing the magnitude of the child abuse and neglect problem, and the key role that child care staff can play in prevention. Guidelines are provided for identifying physical, mental, emotional, and sexual abuse or neglect. The program recommends prevention of child abuse through the use of positive discipline approaches within the child care facility. You learn how to report child abuse and neglect. Case situations are presented in which you must make decisions based on the guidelines or the "make sense rule" for judging whether an injury is an accident or abuse.

A 32-page booklet is available for each trainee, that provides an on-going reference to the major points of the course and can be customized for local regulations and practices.

Care Basics For Nursing Assistants

This 2 to 3 hour introductory course is designed to meet the training needs of nursing assistants working in long-term care. You are led through the program by "CASY" a cheerful character who symbolizes the "Caring And Skillful You". The program provides basic information and skills needed to begin work as a nursing assistant in a long-term care setting, such as a nursing home or other adult group residence. You are introduced to the long-term care environment. Your role and responsibilities as a nursing assistant are defined. The importance of human relations and communication skills are stressed, and the program addresses legal and ethical issues, including residents' rights. The importance of accurate observation,

reporting, and recording is stressed and you learn the sources of infection, how to control infection, fire safety and accident prevention, body mechanics, pivot transfer, and ambulation.

The Training Group

A 1988 entry into the commercial videodisc market is The Training Group, based in Edmonton, Alberta, Canada. It is marketing a series of 12 Cardiology videodisc programs as well as one each in emergency medicine, mega-code, and obstetrics. The programs range in price from \$795 to \$1995, and will play on virtually any videodisc hardware system, including the IBM InfoWindow.

The First And Second Heart Sounds

This program uses video and tutorial to provide an understanding of heart sound intensity, timing and auscultation technique. You are presented with the various hemodynamic events related to the sounds, and then you can practice auscultating patients by touching various chest locations of patients projected on the screen.

Heart Murmurs And Other Sounds

This program uses video and tutorial to provide an understanding of the hemodynamic events associated with heart sounds and murmurs. You are given the history and physical examination findings, and then you auscultate the patient to detect the heart sounds and diagnose the underlying conditions. Given a drawing of the upper body, you point on the screen to the area where you want to hear the heard sounds. You listen to the sounds through a stethoscope that comes with the program.

The Normal Electrocardiogram

This program uses video and tutorial to provide an understanding of basic electrocardiology. You are guided through the various phenomena that influence the electrocardiogram. You are also given the opportunity to simulate use of an ECG machine and perform a 12-lead ECG recording. On the screen is the video of a man's chest. At the bottom of the screen are the various leads of an ECG machine. You touch the lead that should be applied first, and then touch the screen indicating where it should be applied. You watch as the technician applies the lead in the place you indicated. If you select the incorrect lead or the incorrect location, you are coached and then you are given a second opportunity. After each of the leads is

applied, you view an ECG console on the screen, press the start button and the machine runs, recording an ECG.

The Abnormal Electrocardiogram

This program uses video and tutorial to provide an understanding of the abnormal electrocardiogram. You are asked to predict electrocardiographic changes associated with various abnormalities in the atria and ventricles, including bundle branch blocks and infarcts.

Mitral Stenosis

This program uses video and tutorial to provide an opportunity to examine the consequences of mitral stenosis. You learn the physical signs, symptoms and the investigations required to establish the clinical problem. You are given the history and physical examination findings, and then you auscultate the patient to detect the heart sounds and diagnose the underlying condition. Given a drawing of the upper body, you point on the screen to the area where you want to hear the heard sounds. You listen to the sounds through a stethoscope that comes with the program. You can view x-rays of patients with mitral stenosis. When you touch the screen, a graphic overlay points out the changes that occur with mitral stenosis.

Mitral Incompetence

This program uses video and tutorial to provide an opportunity to examine the consequences of mitral incompetence. You learn the physical signs, symptoms and the investigations required to establish the clinical problem. You are given the history and physical examination findings, and then you auscultate the patient to detect the heart sounds and diagnose the underlying condition. Given a drawing of the upper body, you point on the screen to the area where you want to hear the heard sounds. You listen to the sounds through a stethoscope that comes with the program.

Aortic Stenosis

This program uses video and tutorial to provide an opportunity to examine the consequences of mitral stenosis. You learn the physical signs, symptoms and the investigations required to establish the clinical problem. You are given the history and physical examination findings, and then you auscultate the patient to detect the heart sounds and diagnose the underlying condition. Given a drawing of the upper body, you point on the screen to the area where you want to hear the heard sounds. You listen to the sounds through a stethoscope that comes with the program.

Aortic Incompetence

This program uses video and tutorial to provide an opportunity to examine the consequences of mitral stenosis. You learn the physical signs, symptoms and the investigations required to establish the clinical problem. You are given the history and physical examination findings, and then you auscultate the patient to detect the heart sounds and diagnose the underlying condition. Given a drawing of the upper body, you point on the screen to the area where you want to hear the heard sounds. You listen to the sounds through a stethoscope that comes with the program.

Ventricular Septal Defect

This program uses video and tutorial to provide an opportunity to examine the consequences of mitral stenosis. You learn the physical signs, symptoms and the investigations required to establish the clinical problem. You are given the history and physical examination findings, and then you auscultate the patient to detect the heart sounds and diagnose the underlying condition. Given a drawing of the upper body, you point on the screen to the area where you want to hear the heard sounds. You listen to the sounds through a stethoscope that comes with the program.

Atrial Septal Defect

This program uses video and tutorial to provide an opportunity to examine the consequences of mitral stenosis. You learn the physical signs, symptoms and the investigations required to establish the clinical problem. You are given the history and physical examination findings, and then you auscultate the patient to detect the heart sounds and diagnose the underlying condition. Given a drawing of the upper body, you point on the screen to the area where you want to hear the heard sounds. You listen to the sounds through a stethoscope that comes with the program.

Pulmonary Stenosis

This program uses video and tutorial to provide an opportunity to examine the consequences of mitral stenosis. You learn the physical signs, symptoms and the investigations required to establish the clinical problem. You are given the history and physical examination findings, and then you auscultate the patient to detect the heart sounds and diagnose the underlying condition. Given a drawing of the upper body, you point on the screen to the area where you want to hear the heard sounds. You listen to the sounds through a stethoscope that comes with the program.

Patent Ductus Arteriosus

This program uses video and tutorial to provide an opportunity to examine the consequences of mitral stenosis. You learn the physical signs, symptoms and the investigations required to establish the clinical problem. You are given the history and physical examination findings, and then you auscultate the patient to detect the heart sounds and diagnose the underlying condition. Given a drawing of the upper body, you point on the screen to the area where you want to hear the heard sounds. You listen to the sounds through a stethoscope that comes with the program.

Obstetrical Simulation

This program simulates the delivery of a baby in a rural community hospital. Your decisions are monitored and your performance is displayed at the end of the simulation.

Emergency Simulation - Motor Vehicle Accident

This program simulates the result of a motor vehicle accident in which the victim must be assessed, treated, and stabilized in a meadow by emergency personnel. You watch as the paramedics carry out your decisions. If inappropriate decisions are made, you view the consequences, including death of the victim, represented by display of his tombstone. Your decisions are monitored and your performance, including the amount of time you took to treat the patient, is displayed at the completion of the simulation.

As the program opens, you watch as paramedics get a call to attend to a motor vehicle accident. The camera sits on the dashboard of the ambulance as it rushes to the scene. On arrival, you see a vehicle laying on its side as a young woman is bending over a man who is not conscious. She calls you to come help her fiancé. You see his bloody face and hear his gurgled respirations. With the clock ticking, you are given a list of options that include taking a history, checking the airway, managing the fracture, and checking for bleeding. If you select managing the fracture, you are shown a picture of the patient's tombstone, with a message that he died six days later. You can begin again, and make a different selection. When you select check the airway, you hear the paramedic's observation that the mandible is fractured and that there is CSF coming from the patient's nose. After every decision, you are shown the vital signs screen to see what impact your selection had on the patient's condition. There are two main scales. One registers the patient's state of consciousness and the other how much oxygen or air the patient is getting. The screen also displays the current pulse, respiration and blood pressure. When you se-

lect suction as your next move, you watch as the paramedics suction the patient, and then check the vital signs screen to see if his oxygenation has improved. If not, you might choose insert cuffed esophageal obturator. You watch the paramedics insert the obturator and hear them remark that they can't get a tight seal. You notice on the vital signs screen that the patient is deteriorating. When you select intubation, you watch as the paramedics intubate and bag the patient. The vital signs are improving. When the paramedic prepares to listen to the patient's breath sounds, you are shown a drawing of the upper body. You put on the stethoscope that comes with the program, touch the screen where you would like to listen, and you can hear what the paramedic would hear. When you check the vital signs screen, you note that the blood pressure and level of consciousness are decreasing. When you choose to assess and manage bleeding, you hear the medic comment that the patient has lost about 200 cc of blood. The vital signs show some response to your decision to start an IV, and they are visibly improved when you choose to apply MAST trousers. When the patient is stabilized you are appraised of how much time it has taken you. You can then ask his fiancée history questions such as "was he drinking?" You watch as a helicopter arrives to take your patient to the hospital.

Wilson Learning Systems

The Versatile Organization, Version 2.0

This program is a four module course (6-8 hours of learner contact) that teaches the basics of Wilson's Social Style and provides opportunities to discover and practice interpersonal skills that build effective communication and improved working relationships. In addition to a number of experiential segments that introduce and demonstrate the learning points, the course uses gaming and simulation sequences for practicing style identification and meeting style expectations. You participate in realistic situations using interpersonal skills in various management and administrative scenarios. The program is designed to enhance the productivity of managers and administrative staff by increasing their versatility in personal and professional relationships.

The orientation module explains the operation of the interactive videodisc system and gives you an overview of the program. You input your name, Social Style and Versatility Rating and choose whether you wish to view the course as a whole or in discrete modules.

In Module 1, Introduction to Social Styles, you are first acquainted with the concepts of assertiveness and responsiveness and the Social Style grid. Through the

"Observation Game", you choose people you would be most comfortable working with, and then learn how to identify behaviors that are involved in relating to each person.

In Module 2, Social Styles Identification, Expectations and Versatility, you gain an understanding of the value in recognizing patterns in human behavior. You receive your Social Style Profile with explanations and feedback. The concept of versatility is introduced, explained and practiced.

In Module 3, Social Style 'Back-up' Behaviors, you observe examples of people with each of the four Social Styles and their behavior tendencies under tension. You are introduced to strategies that can be used in dealing with these behaviors as well as self-management techniques.

In Module 4, Social Style Simulation 'Game', you participate in a real-world business simulation involving nearly 100 different Social Style interactions. Sixteen different outcomes are possible as you use skills developed in the previous modules. You also find help in making the transition back to your work environment, advice on working with peers, and strategies for integrating the course material.

Management Skills Development Series

This program contains ten distinct, yet integrated modules that teach the basic competencies of management that are required of managers and those aspiring to become managers at all levels. Each module, which takes between 2 to 4 hours to complete, covers one specific management skill. The modules can be studied in any sequence and include: 1) Perception: Identifying information, 2) Organizing and Planning: Establishing procedures, 3) Decision-Making: Reaching conclusions, 4) Decisiveness: Taking action, 5) Interpersonal Relations: Interacting with others, 6) Leadership: Providing direction, 7) Control and Follow-Up: Monitoring performance, 8) Flexibility: Adapting to change, Oral Communication: 9) Talking with others, and 10) Written Communication: Writing to others.

Each module is structured into five units. In the first unit, you are introduced to the concept of managerial skill development and the learning points for the skill being studied. In the second unit, Pre-Assessment, you have the opportunity to evaluate your current skill level by responding to a skill specific Self-Rating Scale. The program then recommends your learning point that needs the most immediate attention. In the third unit, Study and Practice, five learning points are defined and demonstrated. In a set of simulations, you practice the skill, receive immediate feedback to your responses, and have opportunities to repeat or review previous content. In

unit 4, Grand Practice, you go through an integrated simulation that includes applications of all five learning points so that you can test your attainment of the module's objectives. When the simulation is completed, you receive an overall score and you are given an opportunity to receive feedback and a rationale for the correct responses. In unit 5, Summary, Post Session Follow-Up, you find a brief summary of the learning points, and references to two important follow-up resources in the Learner Workbook. A post-assessment is available for a recheck of how well you are applying the skill on-the-job, and a list of suggested on-the-job activities and exercises to encourage application of the skill in different situations.

The Learner Workbook reviews the module content, provides space for note-taking, and furnishes exercises designed to facilitate on-the-job applications after completion of the module.

Non-commercial Videodisc Development

British Columbia Institute of Technology

The Anatomy And Physiology Of The Heart

This program, which provides 8-10 hours of learning material, uses an encyclopedic approach to information about the anatomy and physiology of the heart. Six topic areas are covered in 25 modules. Each module uses video, graphics overlay, a short, fast summary, and a self-test. The program includes an audio-visual database of specimens that can be studied in detail, extensive use of animation, and medical imaging. In each module, the self-test consists of 5 items that are randomly generated from a test bank for each topic. The Anatomy test bank, for example, contains 50 items from which the 5 test-items are chosen.

California State University-Chico

Decision-making In Nursing Practice

This program has two modes for involvement in the decision-making and care of a 22-year-old patient involved in an automobile accident, who is admitted with a fractured lower leg which will require surgery. The two modes are "guided" and "watch". In the "guided" mode, you are assisted in making decisions based on the five components of the nursing process, assessment, diagnosis, planning, intervention, and evaluation. As you progress through the program, you are forced to enter

the correct phase. In the "watch" mode, you observe an expert nurse using the nursing process while caring for and making decisions about the patient's care.

After your initial assessment of this patient with a fractured tibia/fibula, the computer randomly selects one of four tracks in which you deal with one of four different complications. The complications, resulting from the accident or from surgery, are pneumothorax, a ruptured spleen, compartment syndrome, and anaphylaxis from antibiotics. You make decisions as the patient's condition changes and your prompt actions, based on your decisions, determine the patient's outcome. As you make your decisions, feedback is given for correct and incorrect selections.

Carnegie Mellon University

A Right to Die

This program presents the case of Dax Cowart—a victim of severe burns, blindness, and crippling injuries—who persists under treatment to insist that he be allowed to die. Through interviews with Dax and other principals in his case (doctors, lawyer, mother, etc.), the user investigates the basic ethical issues regarding quality of life, autonomy, competence, the obligations of medical professionals, etc. Throughout, the user must address the central dilemma: should Dax be granted his request to die, as well as the reasons why and why not.

National Institutes of Mental Health

Suicidal Adolescent: Identification, Risk Assessment, & Intervention

Three videodisc sides present simulated teenage patients with symptoms of depression and risk of suicide. Videodisc and computer programs also present statistics on suicide, definitions of depression, and a lexicon for the field. Students direct interviews with simulated patients and make judgments regarding diagnosis and treatment.

University of Cincinnati

Managing The Experience Of Labor And Delivery

In this program clinical situations focusing on the normal labor and delivery process, are intertwined with tutorial and psychomotor skill applications. There are three modules. Module One: Admissions, ends after initial assessment data has been collected. Module Two: Labor Management ends just prior to delivery. Mod-

ule Three: Delivery begins during the last hour of labor and continues into the initial postpartum period.

The program provides visual demonstrations, tactile experiences, and auditory highlights. The visual demonstrations found within the program include: graphic overlay of the fetus over the mother's abdomen, fetal monitor strips, varying patient behaviors during labor and delivery, cervical dilatation and effacement, pushing positions, the descent of the fetus through the birth canal, visual clue identification of meconium, blood, and crowning, APGAR scoring, placental examination, and patient support measures.

Tactile experiences include: hand placement for Leopold's maneuvers, measuring cervical dilatation, identification of best location to hear fetal heart tones, the scrub sequence in preparation for delivery, and identification of the intersecting points of a Friedman's curve to chart cervical dilatation and station.

Auditory highlights include: the sounds of labor, delivery and bonding, the newborn cry, verbal cues from the mother, and determination of both the fetal and newborn heart rates.

What follows are descriptions of pieces of the program as they were observed. The entire program was not reviewed. Each module includes more content and activity than is described here.

As the program opens you watch a student nurse at the bedside of a woman in labor. When the mother tells the student the baby is coming, she looks under the covers and, with amazement, says "I believe you." The student calls for help and you hear a calm, nonplused voice over the intercom inform her that everybody is tied up, but that help will be sent as soon as possible, and that the student should "do the best you can." Following this humorously done introduction, you observe a flash-back of how the mother was admitted. You collect patient data and learn about the data by filling in the blanks on a prenatal record form. Included on the form are temperature, pulse, respirations, weight, lab data, fetal heart rate, and the frequency, duration and character of contractions.

As you touch the screen over the blanks for temperature, pulse and respiration, they are filled in. Before the blank for weight is filled-in, you investigate the two weight concerns in pregnancy, too much weight gain or not enough. When elect to fill in the lab data blanks, you find that this mother's glucose was 2+, and that a glucose tolerance test was done. You read about the results of the test and what they mean before they are charted.

If you touch the blank to fill in the fetal heart rate before you have ascertained where the fetal back is, you are told you must do an abdominal examination first. You then view a step-by-step demonstration of Leopold's maneuvers. The maneuvers are broken down into four steps. First you watch and listen to the expert nurse as she demonstrates how to determine the presentation of the infant. After each step is demonstrated, you are asked to touch the location on the screen over the mother's abdomen where you would place your hands for that step. You watch as the nurse demonstrates and describes how to feel the fundus, find the head and the buttocks, find the baby's back and how to check whether the baby is in the pelvis and is or is not engaged. After each step is demonstrated separately, you view the uninterrupted procedure and listen as it is described. A drawing of the fetus over the mother's abdomen shows the lie of the fetus that you have discovered through this examination. You are then asked to touch the back of the fetus where you would hear the fetal heart tones best. With the help of a wristwatch with a second hand on the screen, you listen to and count the fetal heart rate. The program randomly selects different heart tones and different rates. You type in the rate you have counted for one minute. If the rate is not correct, you listen and count again.

To fill in the data that is gathered through a pelvic examination, you are led step by step through the procedures. For example, you are given instruction about the cervical lip and how to determine the degree of cervical dilatation. You place your fingers on a graphic representation of a dilated cervix and then select the degree of dilatation. To determine the position of the fetal head, you watch as a cabbage-patch doll moves down into a pelvis skeleton showing rotation, position, and station. As labor progresses, you are told the station and you stop the movement of the downward movement of the baby at the correct negative or positive station. You then record this information on the labor chart by filling in the Friedman's curve. You select the correct intersection of cervical dilatation and station points on the graph, and a line is drawn from your last entry. The graph builds as labor progresses.

For each hour of labor, you are given a standardized nursing diagnosis, and you select your interventions from the data you have collected. The mandatory interventions that must be completed for each hour of labor include nutrition, safety, teaching, and learning. Other interventions such as those that are comfort-related can be selected but are not essential. With every hour of labor, you can review the patient records, the admission record, the physician orders, flow sheets, and the fetal heart monitor strip which changes hour by hour. You then select the appropriate nursing interventions.

In Module 3, you are involved with the pre-delivery scrub, watch the delivery, and determine the infant's Apgar score. You are shown the area that must be prepped for delivery and you touch, in sequence, the area that must be prepped first, second third, and fourth. As you make your selections, you watch as the area is scrubbed. Each segment of the delivery is shown separately with a description in text on the other half of the screen. Each segment can be replayed as often as desired. The entire delivery is then replayed uninterrupted. You are given a close-up of the baby and asked to determine the Apgar score. Your score is then compared to the expert's score.

Balancing For Diabetic Control

This program was written for junior level nursing students and uses a seesaw as an advanced organizer to describe altered states of diabetes and the need for balance - hyperglycemia and hypoglycemia: insulin and blood glucose levels; exercise, stress and blood glucose levels.

From the main menu, you can select The diabetic patient: A case study, Issues and concerns of the diabetic, and Handling diabetes. While there are two case studies, one about a secretary with an insulin adjustment problems on an active weekend, the majority of the program concerns the needs and questions of Tim, an adolescent who has uncontrolled Type I DM. Among the activities in which you become involved, is a party scene. You are asked to decide whether or not Tim should go to the party, and whether or not he should drink beer. You are then shown the consequences of the decision. If you agree that Tim should go the party, for example, and drink beer, you watch as he drinks the beer, passes out, and frightens his friends. You can return and make different decisions to get a feel for the life of the diabetic, the decisions he or she must make, and the opportunity to observe an out-of-control diabetic.

Other concerns of an adolescent are depicted so that you can discover appropriate responses to give to adolescent patients. Scenarios include illness, fast foods, rotation of insulin sites, and peer pressure.

Within the section, Handling diabetes, you learn do six-day insulin calculations and get a close-up view of several blood glucose monitoring techniques. To learn how to perform the calculations, you hear about the rules for calculation as you watch a computer graphic description of what the rule is and what it means. You then work through several practice problems. To learn about glucose monitoring, you observe a nurse as she works with Tim and explains the different methods. Tim

asks questions that the nurse answers while demonstrating how several glucometers obtain a blood sample and indicate the blood glucose level.

Health History Of The Diabetic And Physical Examination Of The Diabetic

These two programs utilize the case study of Martha Coleman, a middle-aged patient with diabetes mellitus. Mrs. Coleman seeks treatment for a draining abrasion which she received several weeks before.

Health History of the Diabetic. The main menu provides entrance into seven sections: 1) Introduction to the Client, 2) Chief Complaint, 3) History of Present Illness, 4) Past History, 5) Family History, 6) Personal/Social History, and 7) Review of Systems. Video segments are shown to portray the information in each section. After viewing the video, you are asked to select the information that will be included in the patient's chart. Some videos represent flash-backs while in others, you watch as the nurse interviews Mrs. Coleman. As you collect information from each section, the chart is updated, and may be accessed at any time.

Additional tutorial information is presented in sub-menus. Included in the tutorials is a discussion and practice exercise for calculating a diabetic diet. You first review how to calculate ideal body weight, and a discussion of the normal protein, fat and carbohydrate allotments for a normal diet. You are then given a series of case studies, for which you calculate one meal or a 24-hour plan. You can call up a calculator as you work through spreadsheets to calculate the appropriate exchanges for a number of given caloric needs. You then select the foods that can be incorporated into your plans. As you move through each section, you are reminded of the section you are in through a note in the upper right hand corner of the screen.

Physical Examination of the Diabetic. A summary of Mrs. Coleman's History is available before beginning this program. You can select, from the main menu: 1) General Appearance, 2) Skin, 3) Eyes and Mouth, 4) Cardiovascular, 5) Gastrointestinal/Urinary Systems, and 6) Lower Extremities, which includes vascular, neurological and musculoskeletal systems. With each selection, you view a nurse performing the physical examination as the narrator explains. Tutorial information is built into each section. For example the vascular assessment menu is divided into Coldness of the extremities, Vascular filling of extremities, Changes of color of extremities, and Pulses: femoral, popliteal and pedal. Slides are included in several sections that illustrate abnormalities that were not portrayed by this patient, including a variety of leg ulcers and gangrene. A glossary of terms is available throughout the program. As each section is completed, you are asked questions on the material viewed.

University of Iowa

Assessment Of Neuromotor Dysfunction In Infants

This program, a 3 to 5 hour course, provides opportunities to study and discriminate between subtle and gross neurological abnormalities among 27 developmentally disabled and normal infants from newborn to 18 months. From the main menu you can select from among the five components in the assessment; muscle function, movement, reflexes, structure, and gross motor skills, and a case study.

Throughout the tutorial, computer-generated graphics, still frames, and motion video segments are used to direct your attention to specific disability characteristics. Before looking at video segments showing the infant in action, you are introduced to a specific symptom through a computer-generated picture with a voice-over explanation that describes the symptom and the problem. Single video frames are presented on one screen, while a question on the second screen directs your attention. For example, you are shown a single frame and asked if the child appears to be hemiplegic. Or, while studying a still frame picture of an 8-week old infant, you answer whether each of six 8-week Gesell Gross Motor activities is present or absent. After studying a motion segment, you are asked to select whether the deep tendon reflex shown was normal, weak or brisk. Or you view a video segment on one screen while, on the second screen, you are asked if you see a "catch" followed by release, the clasp-knife phenomenon. Each video segment can be repeated.

Over 180 questions are embedded in the program. Many of the questions have a video component. You are told whether your answer was correct or not and which of the multiple-choice selections was correct. Feedback includes reference to specific indications of the problem. For example, if you did not correctly identify that the child pictured was hemiplegic, it is suggested that you notice the fisting and flexed posturing on the baby's right extremity compared to normal movement on the left and to notice the difference in the tone of the lower extremities.

The case study presents a patient that has not been previously shown. You are asked to make diagnostic decisions about an 11 month old boy who is "not developing normally." From a menu, you can choose to assess his muscle function, reflexes, movement, structure, gross motor skills, or read his history and physical data.

University of Texas Medical Branch

Healthcare For Older Adults: A Continuing Education Program For Nurses

This program, which provides about five hours of learning, was developed primarily for practicing nurses to increase their knowledge and heighten their sensitivity to the specialized health care needs and problems of the over-65 age group.

The opening menu provides eight different icons from which you can select seven content areas and an exit routine. The seven areas include: Nutrition, Normal Aging Process, Ethics and Legal Aspects, Physical Assessment, Facts and Figures, Theories of Aging, and Aging and the Humanities.

As you touch the desired icon, it flies from its place on the menu and enlarges to cover the screen. You listen as a narrator gives a brief orientation to the content covered in the module while an animation sequence evolves on the screen. When you select Normal Aging Process, you have three paths to choose from: Physical changes associated with illness, A catalog of normal aging changes, and Clinical challenge case examples.

When you choose Physical changes associated with illness, you can narrow your focus by choosing either dermatological problems or problems with the skeletal system. When you choose the skeletal system, you view computer-generated graphics and multi-image video animation sequences while the narrator presents the content of the module. You can choose to focus on specific health care problems including arthritis, hip fractures, and osteoporosis. When you select arthritis, you learn about this chronic ailment by hearing experts, seeing patients, and by viewing selected x-rays of normal and affected joints. When you choose hip fractures, you see x-rays of a normal hip and a fractured hip while the narrator discusses content. When you choose osteoporosis, x-rays, moving and stop action video and computer graphics are used to present information on the treatment, prevention, and statistical incidence of this problem.

When you select A catalogue of normal aging changes, the focus is on age-related changes documented by three well-known longitudinal studies of aging. You can scroll through a variety of changes in physiological, cognitive and psychological areas.

The content of the program is interconnected throughout the various modules. For example, while studying information on osteoporosis in the Normal Aging Process module, you can elect to explore related information in both the Nutrition module and the Facts and Figures module. You can explore the nutritional status of

the character in the Nutrition module who has osteoporosis, or switch over to the Facts and Figures module to access various statistical information about the incidence and treatment of osteoporosis.

When you select the Humanities module, you listen as the narrator tells you to just sit back and develop an appreciation of aging in the arts. You may choose to hear a poetry reading with aging themes such as permanence and change, and loss and lament. You can view A Gallery Tour of paintings from the National Gallery of Art in Washington DC that depict various aspects of the aging process. You can choose to attend a lecture on the Ages of Man Through History by an expert in the field who traces changes in the way society has viewed aging from Medieval to modern times. Or you can choose to view selected pictures from a traveling exhibition on Iconography and the Life Cycle through the Ages.

When you touch the exit icon, you find a bibliography and a glossary, and you are told how much of the disk you have covered.

University of Washington

Cardiovascular Resources Disc. This two-sided disc contains approximately 4,000 slides covering anatomy, physiology, embryology, microscopic and gross pathology, introductions to care environments and common techniques in the assessment and treatment of cardiovascular disorders. Also included are approximately 500 electrocardiograms and arrhythmias, 200 radiographs and angiograms, 50 echocardiograms, and numerous motion sequences showing patients with various signs and symptoms of cardiovascular disease and techniques for diagnosing and managing cardiovascular disease.

Slow Market Penetration

The majority of vendors who offer interactive videodisc software that is appropriate for nursing education are reluctant to discuss their sales. However, all indications are that sales are slow. The largest number of copies of a single program delivered into the nursing market was accomplished by FITNE (131), but a number of there were distributed free or at the very low price of \$395. In the current market, sales of only 50-75 copies of a single program might be considered good market penetration.

Actronics, Inc.

As of late 1988, a total of 350 Actronics CPR Systems had been installed in various school, hospital, corporate, and other settings. This figure was reported in the December, 1988 issue of *The Videodisc Monitor*. It is not known how many of these systems have been purchased by schools of nursing or hospital education departments. However, in 1987, the Actronics Vice Chairman Danny Cassidy said that the company was struggling until they shifted their marketing focus from the schools and hospitals to the business sector.

American Journal of Nursing Company

In April, 1989, two months after introduction of their first of three planned programs, the AJN reported that it sold 20 copies of *Nursing Care of The Elderly Patient with Chronic Obstructive Pulmonary Disease* at \$995 each. By September, 1989, 40 copies were sold. Sales of this program are boosted by the ten percent discount offered to FITNE members and to MDRVC members

FITNE

As of September, 1989, 131 copies of FITNE's *Intravenous Therapy* program were owned by FITNE members. Of these 131 copies, 46 were distributed free-of-charge to the FITNE Demonstration Centers, and the remaining were sold to the members for \$395 and to non-members for \$695.

Intelligent Images, Inc.

While this company chose not to disclose specific sales figures, the Assistant Vice President for Marketing reported the market interest had grown 300 percent between the release of their first interactive videodisc product in 1984 and 1989. However, at the 1987 Washington Videodisc Conference for the Health Sciences, Intelligent Images founder David Allan, MD indicated that the Intelligent Images programs had been placed in only about 30 locations. (See Appendix C for text of this presentation.)

Mirror Systems

Sales of its award-winning *Introduction to Cardiovascular Examination* were projected to be several hundred. Estimated sales total only 50-60 copies. However, little to no marketing has been accomplished. While Mirror Systems was responsible for the development of the program, the C.V. Mosby Co. was to be responsible

for the marketing. Instead, Mosby never marketed the program and, as a result, *Introduction to Cardiovascular Examination* received little exposure.

For a complete listing of these videodisc programs, see Appendix C: Directory of Interactive Videodisc Software.

Software Purchase Projections for 1998 — \$51.2 Million

Schools of Nursing — \$23.4 Million Per Year

In the two years between early 1987 and April, 1989, it is estimated that each of the schools of nursing that were using microcomputers for nursing education had purchased a minimum of 20 CAI programs. In a 1987 survey, 156 SREB (Southern Regional Education Board) schools reported that they owned 1,082 titles. Several of the institutions reported ownership of more than 100 different titles. The retail prices of this CAI software ranged from \$90 for a one-disk program to \$1,495 for a 13-disk program.

Based on the sales of CAI software for microcomputers, it can be projected reasonably that in 1998, each of the 1,461 (89 percent) school that will own interactive videodisc hardware also will purchase a minimum of 20 interactive videodisc programs that year. This would represent a projected interactive video software sales volume of \$23,376,000 for 1998. The projection is based on the demonstrated rate of adoption of microcomputer technology by schools of nursing, the 1988 purchase rate of CAI programs on floppy disks and average purchase price of these CAI programs, and the known acquisition of videodisc programs.

Hospitals — \$27.8 Million Per Year

By 1998, each one of the 1,737 hospitals projected to have interactive videodisc hardware is expected to purchase 20 videodisc programs per year at an average of \$800 a program. This amounts to a total projected interactive video software sales of \$27,792,000. Again, the number of programs purchased by each institution is dependent on the number of available programs and the perception of their value to educators.

Chapter 8

Meeting the Needs of Nursing Educators

Why Nurse Educators are Not Buying

Ask a room-full of nurse educators why they are not purchasing interactive videodisc technology and the first reason given is cost. However, this answer is too simplistic. The truth is that if a nurse educator finds an instructional tool that is perceived as valuable, the money will be found for its purchase. The educators who in 1986 perceived the value of interactive videodisc technology, even before appropriate software existed, found the funds to purchase the hardware.

Just as businessmen saw no value in the purchase of a microcomputer until *VisiCalc* came along, nurse educators will find various excuses not to buy until valuable interactive videodisc programs come into existence. When such programs become available, as with *VisiCalc*, interactive videodisc sales will take off.

Opinions of Educators in Schools of Nursing

Cost of hardware and software was ranked fourth and fifth in a survey of deans and directors of 305 BSN schools in a survey conducted to identify potential barriers to the growth of instructional computing.

In this survey, Dr. Barbara Thomas asked the deans and directors to rate each of thirteen potential barriers to the growth of instructional computing on a scale of one to four, one being not important and four very important. The lack of educator's

time was the most important reason according to these respondents. The potential barrier rated second most frequently was the lack of educator's skill, and third was the lack of quality software.

Table 8.1: Rank Ordering of Factors that May Inhibit Growth of Instructional Computing in Schools of Nursing

Factor	Rank	Mean
Lack of educator's time	1	3.38
Lack of educator's skill	2	3.28
Lack of quality software	3	3.25
Cost of software	4	3.13
Cost of hardware	5	3.11
Lack of technical assistance	6	3.07
Lack of nursing staff interest	7	3.04
Lack of rewards/incentives	8	3.03
Lack of opportunities to learn	9	2.82
Lack of evidence of worth	10	2.64
Incompatibility	11	2.56
Lack of information about software	12	2.45
Lack of information about hardware	13	2.25

1 = not important; 2 = slightly important; 3 = moderately important; 4 = very important
 Bolwell, C & Thomas, B (1986). *The use of microcomputers for educating nurses in the United States. in MEDINFO 86* (R. Salamon, B. Blum, M. Jorgensen, Eds). North-Holland: Elsevier Science Publishers. pg. 955-959.

This data shows the nursing educator's premium on time and the importance of quality software. When these educators are convinced that interactive videodisc technology will save time, and when videodisc programs are perceived as being quality programs, cost will not be a major barrier.

Opinions of Educators in Hospital

This same instrument was sent to directors of nursing education in 639 community hospitals. To them, the cost of hardware and the cost of software were more important barriers than was the lack of educator's time (means of 3.65 and 3.59 versus 3.38 in school's of nursing).

However, these opinions differed depending of the hospital's bed size. For example, only 58 percent of the educators in hospitals with more than 500 beds believed cost of hardware was a very important barrier. At the opposite end of the scale, 88 percent of the respondents from hospitals with fewer than 50 beds felt cost

of hardware was the most important factor. The same differences of opinions about the cost of software were identified.

Table 8.2: Rank Ordering of Factors that May Inhibit Growth of Instructional Computing in Hospitals

Factor	Rank	Mean
Cost of hardware	1	3.65
Cost of software	2	3.59
Lack of quality software	3	3.18
Lack of technical assistance	4	3.17
Lack of evidence of worth	5	3.10
Lack of educator's skill	6	2.97
Lack of information about software	7	2.96
Lack of opportunities to learn	8	2.87
Lack of information about hardware	9	2.80
Incompatibility	10	2.79
Lack of nursing staff interest	11	2.74
Lack of educators time	12	2.72
Lack of nursing staff interest	13	2.67

1 = not important; 2 = slightly important; 3 = moderately important; 4 = very important

Bolwell, C & Thomas, B (1986). *The use of microcomputers for educating nurses in the United States*. in MEDINFO 86 (R. Salamon, B. Blum, M. Jorgensen, Eds). North-Holland: Elsevier Science Publishers. pg. 955-959.

While hospital education budgets today have been subject to cuts, hospital educators have found the funds to purchase and use audiovisual aides. For example, in this same survey, 94 percent of all respondents reported they used videotapes. Slides were used by 87 percent, 85 percent used film, and 77 percent used film-strip/cassette materials. While these materials are decidedly less expensive than interactive videodisc materials, in view of the high ranking for lack of quality software, the major barrier may be in performance and value rather than in cost alone.

Lack of Quality Software

What do these educators mean when they talk about "quality software?" Although quality is in the eye of the beholder, there are at least three levels at which quality can be evaluated. First, the standard of *purpose or intent* — does the program do what it is supposed to do consistently? Second, *universal standards* — those standards we all expect to find in a product, and when these qualities are missing, we label the product "poor quality". Third, and the most subjective, are *individual stan-*

dards. Does the product measure up to the individual's personal standards of quality?

The marketplace is the final and most telling test of quality. The consumer ultimately decides the quality of a product by rejecting those that don't measure up. Reasons relating to quality given by nurse educators in the decision to not purchase an interactive videodisc program, fall under each of these three levels: 1) the program does not maximize the technology; 2) it was not designed for the needs of nursing; and 3) it does not teach the way the educator teaches—the Not Invented Here Syndrome. While developers have little control over the third determinant of quality, they can comply with the first two.

When evaluating many of the interactive videodisc programs available today by these definitions of quality, it is obvious why nurse educators have not purchased them.

The Program Does Not Maximize the Technology

By definition, interactive video should be interactive. There are significant differences among delivery methods such as the lecture, the textbook, the videotape, and the computer. Each has its own value and purpose.

Interactive. When the attributes of the videodisc medium are not maximized, educators believe it is not the best use of the technology and is thus not cost-effective. For example, one educator said she did not buy Intelligent Image's program *Pathophysiology of Shock* (from their *Assessment & Intervention Series*) "because it was awfully dry and there was little interaction."

Another nursing school educator commented that she believed that Intelligent Images' *Assessment & Intervention* series was made as a tutorial to accompany its *Emergency Care Series*. She felt these tutorial programs were considerably less well produced than the *Emergency Care Series* simulations that were being sold for the same amount of money. "The tutorials seem dull and linear compared to the fast action and interaction of the simulations. They are not worth nearly as much as the simulations," she said.

A nurse educator was interested in using interactive video to fulfill the JCAHO mandated educational programs and previewed those offered by Health EduTech. After her review, she commented, "The programs are just segments of video interrupted with questions. The only action that makes the program different from videotape is that when the user selects an incorrect answer to a question, the pertinent video segment is repeated automatically. Videotape is much cheaper!"

Cost-Effective. An interactive videodisc program will be considered cost-effective if it can be used by a large number of nurses or student nurses, can be used many times by the same student without repetition, and is not quickly out-dated.

Standardized. When standardized material is selected for an interactive videodisc program, it will be appropriate for a large number of nurses and nursing students. A program that can be used only once for one small group of students or nurses increases the cost per student hour and, thus, is not considered cost effective.

Offers Many Options. A cost-effective interactive videodisc program is one that offers many approaches, many different lessons, or many different reasons for using it. For example, AJN's *Nursing Care of the Elderly Patient with Chronic Obstructive Pulmonary Disease* contains four different patient care simulations. Within the library are at least three different lessons; one on blood gas interpretation, another on evaluating lab results, and a third for learning to differentiate breath sounds. Mirror System's *Introduction to Cardiovascular Examination* offers the same flexibility. Like the AJN program, it not only provides a variety of structured learning sequences, it also can be accessed quickly for specific information.

Not Quickly Out-Dated. Not all educational topics are suitable for delivery by interactive videodisc. For example, one educator chose to purchase a videotape on AIDS instead of Professional Training System's interactive videodisc program. She commented, "It [the videodisc program] was very well done, but we chose not to buy it. We worried about the updating."

A hospital educator stated she would not buy Health EduTech's *Infection Control* because it did not include Universal Precautions and, thus, was not current. A nursing school educator said she would not purchase Intelligent Image's *Central Venous Pressure* from its *Assessment & Intervention Series* because "nobody uses those old-fashioned manometers any more."

When any one of these factors is missing, a nurse educator is likely to label such a program as expensive (not cost-effective) and not of high-quality (low price/performance ratio).

The Program Was Not Designed for Nursing

When nurse educators judge an interactive videodisc program touted to be appropriate for nursing, they expect it to meet the universal standards of all nurse educators. The most important standard is the use of the nursing model. While nurse educators are excited by and think highly of the Intelligent Image's *Emergency Care Series*, many have commented that the decisions made in the program are typi-

cal of those made by physicians and not by nurses. As one educator said, "The Dxter series is terrific, but not appropriate for the undergraduate"

After reviewing The Training Group's heart sound series, one educator said, "It is medically oriented, so we chose not to buy it."

The Not-Invented-Here Syndrome

The third level of quality evaluation and the most subjective is judgment according to individual standards, and in this case, standards for teaching. The not-invented-here syndrome is especially prevalent among nursing educators.

Over years of teaching, each educator discovers the most effective methods of delivering a topic, and each has beliefs about what is essential to teach. In addition, regional differences in nursing terminology and philosophy also exist. Nurse educators also seem to evaluate computerized learning materials differently than they do a textbook. When an educator finds cause to disagree with a section of content in a textbook but the textbook is otherwise acceptable, the conflict is overlooked, knowing that it can be circumvented.

When an nursing educator finds cause to disagree with some content in a CAI program, the propensity is to reject it completely. No thought is given to the rest of the program or how the offending piece of content can be made acceptable, perhaps because of the typical educator's naivete in regards to computerized materials.

Perceived Lack of Support

High on the nurse educator's list of important factors that may inhibit the growth of instructional computing was the lack of technical assistance. More than one sale of a CAI program or interactive videodisc program has been lost because the potential purchaser perceived a lack of support and individualized attention. One faculty member reported that while she preferred one interactive videodisc program over another, when there were problems in getting the first program to run, the vendor did not seem helpful or supportive. The second program, while not as well liked, was purchased because its vendor was perceived as responsive and helpful.

Hardware Confusion

The lack of technical assistance to guide the nurse educator through the hardware incompatibility maze is a justifiable reason for avoiding the issue all together.

Accepting poor advice from an individual of firm perceived to be technically savvy also can dampen the enthusiasm of a nurse educator.

The microcomputer hardware confusion and the software incompatibility problems that have arisen with the introduction of the IBM PS/2 line has had a discouraging impact on computer-naïve nurse educators. This disillusionment is compounded by the even more confusing aspects of interactive videodisc technology.

Microcomputers and Nursing CAI Incompatibility.

Until IBM announced its PS/2 line of microcomputers in April, 1987, nurse educators only had to choose between the Apple IIs and the IBM-PC, its clones, and compatibles. Since little educational software was available for the Macintosh, this machine rarely entered into the decision-making process.

Having little knowledge of CAI software incompatibilities, nurse educators were easily persuaded to purchase the IBM-PS/2. When the newly delivered computer would not run the school's new CAI, the educator experienced understandable frustration and disillusionment.

The educator often does not realize there is a difference between the IBM-PCs and the new IBM-PS/2, and the IBM salesman and data processing representatives do not know that most nursing CAI will not run on the PS/2. Over time, many of the software vendors have corrected this problem, but several obstacles still exist. Meanwhile, the nurse educator who has encountered these incompatibility problems may well have decided that educational technology is not worth the hassle.

Interactive Videodisc Hardware Incompatibilities

Those who were brave enough to purchase the PS/2 and an IBM InfoWindow found their problems compounded. Not only would little of the nursing CAI run, but the interactive videodiscs would not run either. One educator tried to run the school's new purchase, Mirror System's *Introduction to Cardiovascular Examination*, on the school's new InfoWindow system. After many telephone calls and discussions with programmers, the problem was thought to be with the InfoWindow Control Program. When the compatible version 1.31 was acquired, the program again would not run. The problem it seems, was that the original *Cardiovascular Examination* program was written to run on the PS/2 model 30 and would not run on the school's model 60. Since then, Mirror Systems has developed a version that successfully runs on PS/2 models 50 and 60.

Job Threat

Until the advent of DRGs, patient care dollars supported educational budgets in many hospitals. However, in this day of dramatic slashes in budgets, many nurse educators are concerned about keeping their jobs. When interactive video is suggested as a cost-effective means of reducing the number of full-time educators, it is likely educators will find many reasons to discourage its purchase. However, even though many nurse educators in hospitals and schools of nursing have been asked, not one can give an example of an educator who has been replaced by a computer.

What Nursing Educators are Willing to Buy

Hebda Survey - CAI Software

In her 1986 survey of 441 NLN-accredited baccalaureate programs, Hebda provided a list of currently available CAI programs and asked the respondents to check the titles they owned. Many respondents added titles they owned but were not listed.

Table 8.3: Top Twelve Most Frequently Owned Commercial CAI Programs in 1986

Program Title	Frequency
NurseStar	57
Computerized Simulations in Clinical Nursing Vol 1 & 2	45
Computer Review of NCLEX-RN	36
Computerized Nursing Skills Simulations	34
Nursing Research CAI	32
Calculate With Care	30
Psychiatric Nursing Simulation	28
Introduction to Nursing Diagnosis	28
DoseCalc	23
Maternity Nursing Simulations	22
Introduction to Behavioral Objectives	17
Pediatric Nursing Simulations	17

Hebda, T. (1987) Unpublished doctoral dissertation.

NCLEX Preparation. The most frequently reported title, *NurseStar*, published by C.V. Mosby, is a computerized simulation of the NCLEX examination. In

addition to providing practice in answering the typical questions posed on the exam, the program also generates a report on areas of strength and weakness. The third most frequent program on the top twelve list is an NCLEX preparation program, *Computer Review of NCLEX-RN*, published by National Nursing Review, Inc.

Patient Care Simulations. While listed by individual titles, the broad type of CAI most frequently owned by these respondents are patient care simulations. The second most frequently owned CAI, *Computerized Simulations in Clinical Nursing Volumes I and II* (published by W.B. Saunders) as well as *Psychiatric Nursing Simulation*, *Maternity Nursing Simulations*, and *Pediatric Nursing Simulations* (all published by Elsevier) are patient care simulations.

Dosage Calculation. Two titles that combine to make up the third most important CAI topic, *Calculate With Care*, published by J.B. Lippincott, and *DoseCalc*, published by C.V. Mosby, provide review and drill and practice in calculating dosages.

Nursing Process. Two nursing process tutorials, *Introduction to Nursing Diagnosis* and *Introduction to Behavioral Objectives*, published by J.B. Lippincott, are high on the list of CAI topics of interest. The sales of these programs has increased over the years. By April, 1989, 773 copies of *Introduction* had been sold.

Nursing Skills. The fourth most frequently owned CAI program, *Computerized Nursing Skills Simulations*, published by J.B. Lippincott, was one of the first three nursing CAI programs to be made commercially available in 1982. This set of five programs provides practice in nursing skills such as dosage calculation, preparing medications, calculating and adjusting intravenous rates, and judging levels of urine glucose and acetone. In these highly interactive simulations, students use cursor-moving keys to set the drip rates and draw medications to correct levels in a syringe.

When the frequencies in each topic category are combined, the topic most frequently owned was patient care simulations.

Table 8.4 . Best Selling CAI Topics

Topic	Frequency
Patient Care Simulations	112
Preparation for NCLEX-RN	93
Dosage Calculation	89
Nursing Process	44

SREB Survey - CAI Software

While the Hebda study looked at the titles of CAI programs owned by BSN schools of nursing in 1986, the 1988 SREB survey reports the content areas that are taught using CAI in both ADN and BSN programs.

Table 8.5: Nursing Content Areas Taught Using CAI, 1988

Content Area	% ADN and BSN Schools
Calculations	66
Patient Care	
Case Studies	52
Adult Nursing	58
Clinical decision-making	44
Basic mathematics	50
NCLEX preparation	52
Nursing process	47
Maternity nursing	43
Pediatric nursing	42
Psychiatric nursing	40
Pharmacology	36
Research	23
Nursing skills	20

Aiken, E. (1988). Computer use in undergraduate nursing education programs. A study of 550 programs. Atlanta, GA: Southern Regional Education Board.

Little has changed since the 1986 Hebda survey. Patient care simulations are most frequently used in all content areas, followed by dosage calculation and basic mathematics for drill and practice remediation.

Rizzolo Study - Interactive Video

In 1987, as part of her doctoral dissertation, Mary Anne Rizzolo designed and implemented a delphi study to determine the factors that influence the development and use of interactive video in nursing education. This study examines the interactive videodisc preferences of 31 nursing education experts.

In each of three rounds of questionnaires, the participants ranked content and types of programs that could be taught efficiently using interactive video. Receiving highest mean ranking on a scale of 1 to 5 (5 = most efficient) were nursing care management programs that include assessment, decision-making, priority set-

ting and problem solving - patient care simulations. Interpersonal and communication skills between the nurse and clients, families, administrators, and physicians were rated the next highest. Psychomotor skills, complex, high tech, critical care skills such as care of arterial lines, calibration of monitoring devices, and time-oriented, emergency skills and procedures followed. The experts recommended, but did not rank as highly, the JCAHO mandatory programs such as infection control and safety.

Table 8.6: Ranking of Recommended Interactive Videodisc Program Content

Content	Mean
Patient care simulations	4.74
Communication skills	4.45
Psychomotor skills	4.29
Emergency skills and procedures	4.26
Hospital orientation information	4.06
Leadership and management skills	3.93

The respondents also ranked the types of interactive videodisc programs that developers should focus on to meet the needs of nursing education.

Table 8.7: Recommended Types of Interactive Videodisc Programs

Type	Rank of Importance
Simulations	1
Generic discs and visual databanks	2
Critical care skills	3
Nursing skills	4
Testing and evaluation	5
Tutorials	6

Rizzolo, M.A. (1987). Unpublished doctoral dissertation.

FITNE Survey - Interactive Video

In a 1988 survey of FITNE members, respondents listed desired interactive video programs.

Patient Care Simulations. The most frequently desired program was one that focuses on critical thinking and decision-making. Simulations were highly desirable,

and many cited the need for simulations in psychiatric nursing, obstetrical nursing, pediatric nursing, medical-surgical nursing, and critical care.

It is not difficult to understand the need for simulations in these areas. Many faculty have stated that it is impossible for each student to care for patients in these areas and thus achieve the mandatory objectives of their clinical experience. Many of the patients that were routinely cared for by students ten years ago now are being treated as outpatients; or if they are hospitalized, they are frequently too seriously ill to be cared for by beginning students.

Pediatric, Obstetrical, Psychiatric Simulations. Because the emphasis on pediatric, obstetrical, and psychiatric nursing care has been decreased in the NCLEX, many schools are adjusting their curriculum to reflect this shift. While educators believe their students need preparation for practice in these areas as part of their basic nursing education, less time is being allocated in the curriculum. The use of CAI simulations provides an opportunity for students to learn about patient care in these areas and to simulate practice in these settings without impinging on the available class time.

Critical Care Simulations. Educators also recognize that many of their students will graduate and assume positions in critical care units. The RN vacancy rate in critical care units today is 13.8 percent, and the annual turnover is 25 percent. More and more hospitals are hiring new graduates to fill these positions.

The American Association of Critical Care Nurses (AACN), in conjunction with the NLN, funded a study to explore the extent to which baccalaureate schools are incorporating critical care content. The study disclosed that few programs include critical care content and that there is little consistency in content or clinical experience. Barriers included limited faculty with critical care expertise, limited time to teach this content, and limited access to hospitals for clinical experience. In addition, because the severity of illness among patients in general nursing units has increased, new graduates will also care for patients who, several years ago, would have been found only in critical care units. Once again, the use of interactive videodisc simulations could overcome these barriers.

Nursing Skills. Also on the list of desired programs are those that teach nursing skills. Of interest are the basic skills such as bed-making and sterile procedures, to the advanced skills of physical assessment, medication administration, and urinary catheterization. Communication, another important nursing skill, was listed as well.

Pharmacology. On the list of desired topics, FITNE members included computerized programs that teach Pharmacology. While Pharmacology is a must, it is rare to find a course in the nursing curriculum devoted to Pharmacology. Schools of nursing teach the content in several different ways. Most often, drug information is spread throughout the curriculum and introduced where relevant. For example, drugs used in obstetrical patients are covered in a course that focuses on maternal and child health. Some schools have a separate course in pharmacology. One school, the University of Alabama, Capstone, uses a faculty-developed CAI course of independent study to deliver all pharmacology content in one course.

Nursing Process. Many faculty contend that it is difficult to learn and to teach the nursing process. The FITNE members included in their list of desirable programs one on nursing process. A program that would give students an opportunity to review the concept as frequently as needed and to rehearse the implementation of the process in a variety of patient care situations would be useful, according to many faculty.

Management and Leadership. Due to the recent changes in the questions presented in the NCLEX, FITNE members stated they would like to have programs that were useful in teaching and rehearsing management and leadership skills.

Chapter 9

Factors That Will Affect Growth of Interactive Videodisc Technology

Potential Constraining Factors

Lack of Quality Software. The most significant factor that may inhibit an extraordinary growth in the purchase of interactive videodisc technology is the lack of software to buy. Nursing education has demonstrated convincingly that if quality software is available, they will find the funds for its purchase.

Budget Pressures. Budget pressures imposed on hospitals by the implementation of DRGs and the nursing shortage has reduced the ability of education departments to purchase hardware. The stumbling block for technology integration by hospital-based nurse educators has been the acquisition of hardware. While most education department budgets support the purchase of software, proposals submitted to hospital administration for capital expenditures, such as computer hardware, have been met with considerable resistance. Unlike faculty in schools of nursing, hospital educators have not discovered how to procure grant and foundation monies. While some hospital educators claim to recognize the availability of these funds, they are unwilling or unable to spend the time to write proposals.

Cost-Awareness. It would be an easy job to convince hospital administration that the use of interactive videodisc technology is cost-effective if you could compare it with the cost of providing education using traditional methods. It is extremely

rare, if not impossible, to find a hospital whose administrators, or even education directors, know how much is being spent for nursing education.

Accelerating Factors

Less Techno-phobia. In 1982 when schools of nursing were first acquiring microcomputers fear of using computers was commonplace. Over the years, more and more nurse educators in hospitals and schools of nursing are using them comfortably. As one educator put it, "before long, all those faculty who are afraid of computers will retire." In the 1990's, the acceptance of interactive videodisc will accelerate because we will not have to overcome the degree of techno-phobia that hampered the acceptance of microcomputer technology.

Increased Demand for Flexible, Fast Learning Methods. Because of the shortage of nurses, students, especially RN students, need to wisk through school and return to the work force. To meet the educational needs of employed RNs, learning time must be swift, flexible, and individualized, so that time away from the bedside is minimized.

Reduced Number of Faculty per Student. In their latest survey of baccalaureate and higher degree programs, among the reporting 1,451 nursing programs the total budgeted full and part-time faculty vacancies was 869. This number of vacancies translates into 4.6 vacancies per 100 full-time faculty - an unprecedented number of vacancies (compare with 3.3 in 1986). The number of 1988 vacancies was up 45.7 percent in ADN schools, up 35.2 percent in diploma schools, and up 17.2 percent in BSN and higher degree programs over 1986. Should this trend continue, the need for technology to supplement this labor force will become obvious.

FITNE. Dedicated to total integration of interactive videodisc technology in nursing, FITNE provides nursing specific hardware, discounted software, and the reasurring support needed by enthusiastic but untutored nurse educators. FITNE is responsible for installing interactive video hardware in 5 percent of all nursing schools in just one year.

Computerized NCLEX. This nursing licensure examination will be administered by computer beginning in 1992. It will incorporate computerized simulations using videodisc technology within a decade. With decreasing enrollments, schools of nursing are competing for students. A high-rate of NCLEX passing is a significant feature for recruitment. With considerable pressure on schools to maintain a high rate, they will be eager to incorporate methods of insuring that their students will feel comfortable using a computer for this important examination.

Increased Infusion of Capital. Because of the nursing shortage, new funds are being infused into nursing education from sources that include Federal, state, and local governments, foundations, university patrons and benefactors, industry, and even hospital recruitment budgets. What follows are examples of the size and types of funds flowing into nursing education programs that will have a significant impact on their budgets, and on their ability to purchase interactive videodisc hardware and software.

The following chart illustrates the wide variety of institutions which are directing their attention and their funds toward nursing education budgets drawn by a desire to improve the nursing shortage.

Table 8.1: Examples of New Capital Infusions for Nursing Education

Amount	Institution	Purpose
Foundations		
\$2.7 million / yr	Helene Fuld Trust	Educational hardware & software
\$1.86 million	W.K. Kellogg	Development & testing of videodisc simulations NCLEX
\$26.8 million	Pew Charitable & R.W. Johnson	Recruitment & upgrading skills
\$1 million	Friends of Nursing	Scholarships
\$200,000	Friends of UMH	Scholarships
\$50,000	Champlin	Interactive video hardware & software
Federal Government		
\$107.9 million		Authorized FY 1990 for Nursing Education Programs
State Governments		
\$20 million	State of NJ	To hospitals for projects increasing efficient use of nurses' time
\$500,000	State of CA	Nursing student recruitment
\$350,000	State of WA	Nursing scholarships

Magnetic Pull of the 21st Century. There is a psychological fascination, writes John Naisbitt, with the end of an old century and the beginning of a new century. The end of an old millennium and the pull toward the beginning of a new millennium is even stronger. The magnetic pull of the year 2000, just 10 years away, will

accelerate all trends, including the integration of interactive videodisc technology in nursing education.

Conclusions

The size of this niche market today is respectable and the need for interactive videodisc technology in nursing education is extraordinary. Nurse educators are tremendously excited by its potential. The projected market estimates in this report are conservative and are based on the market conditions today, including the availability of useful, quality software. Because of the escalating national attention to the nursing shortage and the recognized need for more highly educated nurses, the next few years will bring about a reversal of the monetary constraints of today and change the face of the market. The videodisc developer who made the decision today to enter this market would be well-positioned to take advantage of this potential for growth.

Appendix A

Exploring the Hospital Videodisc Market

An expert panel took an look at the hospital videodisc market as part of the Washington Videodisc Conference held in October 1987. The following transcripts are reprinted from the market report Videodiscs in Healthcare: A Guide to the Industry, by Stewart Publishing, Inc.

The Role of Interactive Videodisc Technology in the Changing Hospital Financial Environment

Ann Huntsman, Human Resources Administrator, El Camino Hospital

Interactive videodisc is very expensive technology to an industry that is under siege. I wrote to my 10th District representative this summer trying to help him understand what this ratcheting down in health care is doing to us and he wrote back and gently reminded me that the House Ways and Means Committee had just cut 1.5 billion dollars from Medicare in order to stay within the budget. Now the lion's share of that cut has come out of the Federal Government's payment to hospitals.

I work in a hospital that probably has a reputation of being one of the better managed organizations in this country. It's a \$100 million operation and when we went through the budgeting process this last spring we were looking at \$19 million in bad debt this fiscal year that just started in July. About 75% of that is what we will not get paid from Medicare for taking care of Medicare patients. Another 15 % is what we will not be paid by MediCAL, the California version of Medicare. Another

10 or so percent is human beings who don't pay their bills, so you see where that leaves us. Although we get criticized for not managing well in health care, I think we manage extremely well to survive under those circumstances. You have to understand that when you are talking to us and trying to sell very expensive technology.

On the other hand, we are also under siege because we have developed a voracious and insatiable appetite for health care in this country. I would site, for example, that our product, patient care, is subject to the most erratic swing of emotional decision-making of any product in any industry that I know of. There are children who receive 2 or 3 organ transplants before they die while at the same time there are children out in East Palo Alto who don't get any dental care until they join the army. I think we are gutless when it comes to making good, tough decisions. When the President of the United States appeals to people to contribute funds for a child to have an organ transplant, you begin to see the magnitude of the emotionalism in the decision-making in health care.

Possible Areas of Application

This is an industry that is looking for creative ways to keep people well and get patients out of the hospital faster. The trend is to provide more services on an outpatient basis. How could video technology help us?

Preoperative/Postoperative Education. What would be helpful in getting people in and out of the hospital faster? Preoperative education, for one. Suppose that a patient could watch a videodisc program to learn about preoperative preparation, what they should be doing, coughing and deep breathing exercising for example. Likewise when they leave the hospital, same types of technology could be used to teach them how to manage themselves at home.

Home Health Care. Another burgeoning area is the area of self care. We are reading a lot in the literature now about the sandwich generation, those people who are caught still taking care of their teenaged children and also taking care of aging parents and having to do that in a home setting. We could use programs on how to give a bed bath, how to give an injection, how to do soaks, how to administer ear drops, eye dressings, intravenous therapy, how to change colostomy dressings, those kinds of items.

Staff Training. Other areas that are popular for training relate to the JCAH standards. Programs are needed on back care, electrical safety, and the like. At El Camino we doubled our back injuries in the last 2 years from 24 to 48. It's reflective of the stress of the times and the increasing work load.

Employee Communications. One of the things that I am aware of is the terrible deficit in the area of employee communications, particularly around things like benefits. Interactive videodisc technology is well suited to employee communication regarding benefits and presenting what-if type scenarios. This kind of a program could be offered on three levels. First, to explain all aspects of the benefits plan in detail, including an explanation of what benefits are not included. At the second level, the program could explain the plan in relation to that employee's overall environment, considering factors like spouse's income and other outside income. At the third level, it could provide decision-making information and scenarios of various options that could be described or charted. Presented properly that type of benefits communications program would help the employee make wise choices in selecting options and enjoy their whole benefits program more.

Advantages of Videodisc Technology

Interactive videodisc represents one of the biggest technological advances for development and implementation of health care education and training. With the ability to randomly and almost instantaneously access any one of 54,000 still images, or fewer in combination with full motion video sequences, computer-assisted videodisc players bring to the training and education field the following:

True individualized self-paced learning through branching instruction that provides for reinforcement and remediation where necessary

Retention levels of as much as 50 to 100 percent greater than linear videotapes and as much as 100 to 200 percent greater than the traditional classroom and textbooks methods

The ability to present real life simulations with a variety of what-if situations that permit the learner to make judgments and experience the outcome of their decisions. That is what I think is the most dramatic.

The ability to record learner's choices, learner's progress and test scores in this era of ever increasing expectations and regulations around documentation.

Marketing Approach

When you are marketing to healthcare institutions, you must be able to demonstrate how videodisc technology can save time, money, energy and resources. Many administrators and educators in health care do not know what they are presently spending for training, so you must go in with a simple model to help people identify the extent and location of their current costs. I think that was one of the

smartest moves that Actronics made when they were marketing that very sophisticated program for CPR training. They came in and helped people identify what we were presently spending for CPR.

One of the things that you might help us do when you approach hospitals is help us find grant sources. You could do a little bit of research and when you are trying to sell to a hospital suggest or co-write with them proposals on where to get grant monies. Another technique that you might use is to identify top flight hospitals, a hospitable environment for new technology and make a deal with them to put your materials in that hospital in return for demonstrations, evaluative information, publicity, and connections with other likely buyers. In health care, as in other industries, the top flight organizations serve as role models for other organizations and it would be beneficial to cut a deal with people like that.

But the biggest problem of all of this is equipment incompatibility. The lack of a standard format makes it very difficult for us when we are at the decision point regarding what we are going to buy. I believe that this is the key to whether or not significant numbers of hospitals will adopt this technology.

The Need for Interactive Videodisc Technology in the Hospital Environment

David Allan, M.D., President, Intelligent Images, Inc.

There's a vast explosion of new knowledge that's going on in the field of medicine. The new technologies, particularly in acute care and critical care, are expanding rapidly and there's an enormous need to keep up to date with these changes. In addition, with the cost containment era, hospitals now have a higher percentage of patients with multisystem disease, which is more difficult to train for than single system diseases. At the same time the resources that are available for education and training are being restricted.

Admissions are declining. The latest figure I have is that hospitals average about a 60 percent occupancy rate. The first thing that goes during a budget cut seems to be education. On a national level, the government's ability and willingness to pay for education as part of the Medicare and MediCal payments is being drastically reduced. As a result of all of these factors, there are immense pressures being put on hospital education and training programs, and I think that the interactive videodisc can help meet a lot of these pressures.

Benefits of Videodisc Technology

I think the interactive videodisc has enormous benefits for the hospitals and these have to be clearly shown as you go out to market this. One of the greatest strengths of interactive videodiscs is that it can teach more than just information, it can also teach how to apply that information by giving immediate feedback and showing the consequences of decisions. Videodisc technology is also very reliable, easy to operate, user friendly, and can be made available to all shifts at all times. Interactive videodisc programs have been shown to increase the efficiency of learning and can teach problem-solving far better than any other medium can do. It can impose real life pressures on the learner without putting the patients at risk. It can provide individualized self-directed learning and can be used repeatedly to improve performance. With interactive videodisc systems you can document both time and performance, print it out, and file the results in the learner's chart. This way, when the JCAH surveyors come around it's much easier to document some type of performance review.

Marketing Problems

The major difficulties we've had in marketing to hospitals have been, first of all, the need to educate the marketplace about interactive videodisc. Cost is another problem area, though I don't think this is an expensive technology. For example, if our 12 programs would be used by nurses in a hospital say, once a year, there would be a cost savings of \$20,000 per year for every 100 nurses. It can clearly be shown that the interactive videodisc is cost effective.

Another, and I think major issue, has been to change people's behavior in the educational process. It is notoriously difficult to change the behavior of hospital people. They have always done it this way and it's always been all right, so why should they change it? I think that as more and more systems are out in schools and in hospitals, the process of change in itself will become easier.

The final major issue relates to the quality of the product being offered. There's been too much emphasis on the technology, on the hardware, and not enough emphasis on what the courseware can do. I think also that it's vital that we develop good materials and we begin to evaluate them properly.

Conclusion

I think that without any doubt, this interactive technology, whether it turns out to be interactive videodisc, CD-I, DVI, or whatever, that it is here to stay. I think

if we use it properly and develop high quality courseware and focus that courseware properly, it's going to make an immense impact on health sciences education.

Educational expenditures in hospitals alone are some \$10 billion per year. When you add on top of that medical schools and nursing schools, and the money spent by pharmaceutical companies and medical equipment companies to educate people about how to use their products, the total marketplace is just enormous. It must be somewhere around \$20 billion, or even more, that is being spent on health sciences education.

It's not been easy being a pioneer in this field, but I think the pioneering days have now gone and that by the end of 1988, the 6 percent of hospitals that now have interactive videodisc capability will have multiplied immensely.

Considerations In Marketing Interactive Videodisc Programs In the Hospital Environment.

Danny Cassidy, M.D., Vice Chairman, Actronics, Inc.

The hospital marketplace that we are dealing with can really be defined as 7,000 hospitals, 1,400 or so nursing schools, and 300 or so medical schools, since most programs could be sold to any of those locations. This is a large market, yet Actronics, which has been in existence for quite a few years (since 1984) has placed only around 300 systems and Intelligent Images has sold a total of about 50 systems. As you can see, interactive videodisc has not really penetrated the marketplace very far.

Now if we try to define the marketplace in terms of dollar value, you will understand why there's a lot of entrepreneurs out there trying to produce something that might be sold. SK&A estimated that the average hospital spends between \$300,000 and \$670,000 a year just in its direct trainer cost. This is the cost of personnel to provide the training. Now when you add in lost productivity from the standpoint of employees who are taken off the job in order to be trained, when you look at the cost of items such as videotapes and outside video production, you get into a figure that ranges between \$900,000 and \$2 million per year per hospital that is being spent on education and training. If you just take the midpoint of those estimates, that equates to a \$10 billion a year industry just in the hospital marketplace. So I think everyone would agree that it's probably a worthwhile marketplace to go after.

Positive Features of the Hospital Market

Now, what are some of the good features of this marketplace? I think probably most important is that it's easy to find a large number of generic needs. Certainly the problem of infections in hospitals is a chronic need. The need for CPR training is a very well-defined need. Most of the major problem areas of the hospital, or the areas where education is needed, can be thought of in very generic terms.

Also, there's no question the need for training is very high. Hospital training is already being regulated and will continue to be regulated to even higher degrees, by the accrediting commissions, Federal agencies, the insurance industry, you name it. Somebody's going to get into the picture and decide that there's another requirement that needs to be met in order to safeguard the health and care of patients. So obviously they have a need.

Another positive factor is that, by and large, there is a great deal of interest in the healthcare industry in new technologies. They are used to new ideas, they are used to new methodologies of doing things, many of the initial products that were developed in the interactive videodisc area were developed in medical schools or for hospital training. I think another important consideration is that hospital personnel are dealing with CAT scans, electronic systems to calculate the lab values, electronic distribution systems--they are living in a day to day world that involves lots of electronics and lots of high technology. As a consequence, you do not have to deal with the technology phobia that might be encountered in other marketplaces.

Negative Features of the Hospital Market

Unfortunately, there are some negative features of the marketplace as well. I think the lack of centralization of training is a major, major problem area. Take a typical subject like cardiopulmonary resuscitation. In an average hospital you have a nursing inservice program that is providing CPR training for its in-house staff, you have a medical staff education program where the physicians on the staff are getting their training, and you also have all the nonprofessional staff to be trained and that's under another department. In addition to that, you have medical and nursing students taken care of by another location within the hospital. If you have a program that's involved with training the parents of high-risk infants in how to do CPR before they take the child home, or a program that's associated with the coronary care unit so that whenever a patient comes into the hospital and the family needs to have CPR training before they leave the hospital, that inpatient education is handled by another department within the hospital. And of course, last of all but still very impor-

tant, you have the whole marketing effort of the hospital that might include community outreach programs that are teaching CPR to the public.

That lack of centralization really makes it very, very hard for you to know who to call on. In addition, while their total number of people that need to be trained each year in a hospital might 500 to 2,000, no one single department may have a significant chunk of that activity that justifies their expenditures in this area.

Not Invented Here. Another major problem if you are really out there getting into the hospitals and talking with people is what I call the not-invented-here syndrome. Let's face it, virtually every doctor on every staff and every nurse educator in the hospital is an expert in their area of medicine. As a consequence, they have their own preferences or their own variations on a theme that are the rule at their location. They are looking for a unique way of doing a procedure that is impossible to present if you are producing a generic version of a program.

Perceived Inability To Pay. I think one result of the noncentralization education and training is that the staff educators, nurse educators and physician educators each perceive themselves to have a low ability to pay. Somewhere along the line hospitals spend \$10 billion a year training people, so there should not be an inability to pay. There's dollars being spent every day, but if you only see one small aspect of the budget you perceive yourself to have very little spending capability. Most educators are not trained as administrators and feel powerless when it comes to major budgeting decisions.

Impact of DRGs. I think the other area that has had a major impact on hospital training is DRGs. When DRG's initially were announced the impact on capital expenditures on hospitals was phenomenal. As a result, hospital accounting systems had to totally change the way they were dealing with all kinds of problems. You went from an educational system that was directly reimbursed to an educational system that really was not even acknowledged within the DRG repayment structure. Now what has happened because of that is that, over the last 3 or 4 years, the really efficient hospitals have survived and the nonefficient hospitals have been absorbed into other hospital chains, have gone out of business, or have merged with other facilities.

The positive impact of DRGs is that now hospitals have much stronger accounting procedures and they understand where their costs are coming from. I think, ultimately, DRGs will be the strongest force to help get technology in education into the marketplace because there if you can demonstrate cost savings, cost productivity, then you are going to end up benefiting from that.

Problems Related to the Technology

Now in addition to these characteristics of the marketplace you are selling to, let's look at the problems that our products have. One is the high cost of hardware. The average interactive video learning system is running between a low end of about \$6,000, to a high end of \$10,000 to \$12,000. Another major problem is multiple hardware types. There are more hardware configurations than anybody can figure out and that really confuses the buyer--and it confuses the seller, I think, too. Software incompatibility is another problem. Nobody can take their software off the shelf and run it into any one of these systems.

Cost of Marketing

Another issue that we don't like to talk about but you need to be aware of is the high cost of sales. The sales force consumes a considerable resource on the side of the R&D groups that are putting together these programs. A salesman will cost you anywhere from \$40,000 to \$60,000 a year just for his salary and he's going to be doing lots and lots of traveling.

What you may not be aware of is that the sales cycle for capital expenditure in a hospital in the most optimistic situation is going to take 6 months. The average situation is going to be closer to 18 months. The reason for that is that with a \$5,000 to \$10,000 hardware package you are dealing with a capital expenditure so it's got to be put into the budget and getting into that budgetary process and getting the dollars actually spent is a fairly significant cycle to go through. So if you are out there fielding a sales force you can just darn near bet that you are going to be supporting that salesman without any commissions to pay his salary for at least 6 months--and if you are very wise you better figure it's going to be at least a year. That is a lot of money to spend before you ever see your first sale.

Marketing Techniques

Now, putting all that together, what kind of things can we try to recommend to both us in the marketplace as well as to the various hardware vendors and other people? I think, number one, we must demonstrate that we are increasing the trainer productivity. Actronics, whether it meant to or not, was perceived as trying to replace the CPR trainer. That is not a good position to be in. What you want to do is to expand the capability of those people who are doing training to make them more productive so that the same individual can train twice as many people rather than being replaced. The human element is not going to go out of training.

The second important area is to demonstrate a reduction in lost productivity time for employees. We either need to make them get their training on the site so that they are not taken off the job or in some manner reduce the amount of time that is paid for personnel being trained where they are not actually producing for the hospital.

We also need to focus on generic topic areas not to waste our efforts in developing expensive videodisc products that do not meet some kind of generic marketplace. I think because of the not-invented-here syndrome, we had better focus on including options to tailor these generic programs to the needs of an individual hospital. For instance, on the arrhythmia recognition course we market, you can add or subtract any of the topics that are contained on that program. In the CPR course you can change the local phone number for an emergency to the phone number that's used in your facility. These kinds of tailoring options I think are going to be required to overcome the not-invented-here component.

I think all of our companies need to get together to look at joint marketing opportunities. The individual cost of sales force to each company is outrageous. David Allan has had his experiments with a sales force that was large; I've had my experiments with a large sales force, and they cost of a lot of money. Until we get together and start having joint marketing efforts, none of us are going to enjoy the successes that we'd like to see.

I also think that it's also important we recognize that among all these compatibility issues, that we as vendors are going to have to at least do something to try to support as many of the major hardware configurations in the marketplace. Now that's not going to be all of them because there are 7,000 variations. But you can choose the market leaders and try to do what you can to support them.

Future of Interactive Technology

Now that I've given you all of the recommendations, let me just give you my prediction for what I think is going to happen. I think that none of us are going to do well until some technology like CD-I comes out of the woodwork and addresses the real problem areas. CD-I offers the ability to have low cost, standardized hardware systems. You don't have to worry whether it was built by IBM or whether it was built by DEC or built by Sony. It has one standard configuration and it also has one common software. All software produced for CD-I will run on all CD-I hardware systems. Until you have those kind of situations, low cost standardized

hardware and low cost standardized software, the marketplace is never going to even begin to recognize the potential that it has in the medical education field.

Appendix B

Case Studies: How Interactive Videodisc Software is Being Used

BSN Program- University of Cincinnati College of Nursing & Health

Junior nursing students at the University of Cincinnati are required to go through the interactive videodisc program *Balancing for Diabetic Control*. The program, which replaces the traditional lecture on diabetes, was developed by this school of nursing because many students have problems with the content, and frequently do not have sufficient opportunities to observe the consequences of the disease. The program provides opportunities to view a diabetic who is hypo- or hyperglycemic in a variety of situations, examine a wide variety of foot ulcers, observe a nurse teaching a patient the concepts and procedures for blood glucose monitoring, learning and practicing six-day insulin calculations.

BSN Program - University of Rhode Island School of Nursing

The school of nursing at the University of Rhode Island has an assortment of four interactive videodisc programs. Two programs are used in their nursing strategies course where the undergraduate students learn psychomotor and assessment skills. Two interactive videodisc programs are used for learning auscultation skills.

Mirror System's *Introduction to Cardiovascular Examination* is used by undergraduate students to learn about heart sounds. Listening practice is provided with this program instead of formerly used audiotapes. The program is also used as a ref-

erence for introducing specific heart sounds and their underlying pathophysiology. The program, ideal for undergraduates, does not include distinguishing the finer heart sounds and abnormalities needed by the graduates students. These students start out using the Mirror program, and to learn more advanced heart sound they use a heart sound simulator machine.

Auscultation of Normal Breath Sounds, one of the Assessment & Intervention Series from Intelligent Images, is used by students in their Nursing Strategies course as well. The students use it to listen to breath sounds over and over again. When they are studying auscultation of the lungs, they are assigned the interactive videodisc program instead of the audiotape used in the past.

The senior medical-surgical students are using AJN's *Nursing Care of the Elderly Patient with Chronic Obstructive Pulmonary Disease* as an adjunct. Because this is a newly released program, faculty have not completed plans for its integration.

Bits and pieces from the program *Understanding Aging* from Professional Training Systems are being used in the health promotion course and in geriatrics in health care. A section of the program has been assigned as homework in the health promotion course.

BSN Program - Rutgers School of Nursing

The School of Nursing at Rutgers State University in New Jersey, is using three interactive videodisc programs. The *Auscultation of Normal Breath Sounds* and *Chest Tube Therapy* programs that are on the same disc from Intelligent Image's Assessment & Intervention Series are being used by junior year students in their acute care course. the students gather in small groups to learn the content. The faculty report that this is an area where the students need help and they wish there were other programs that address this content from a nursing perspective.

Junior students in the Physical Assessment course use two programs from The Training Group *First and Second Heart Sounds* and *The Normal EKG*. These programs are also used in the second semester acute care course.

AJN's *Nursing Care of the Elderly Patient with Chronic Obstructive Pulmonary Disease* is used by senior students in their chronicity course as a simulated exercise in caring for this type of patient.

ADN & LVN Program - Hocking Technical College

At Hocking Technical College in Nelsonville, Ohio, the department of nursing faculty had to set up, present, and test 14 nursing skills each week in their skills laboratory. On top of this, demonstrations had to be repeated for students needing remediation and for students who were absent. The faculty recognized that during a live demonstration of a nursing skill, every student does not have a perfect view of what the instructor is doing.

To overcome these problems they considered using videotapes of demonstrations, but found that frequent use caused wear and tear on the tapes. It was also not possible to freeze frame a specific portion of the demonstration, an important capability while teaching skills. To date, the faculty at Hocking Technical have developed four videodisc skill demonstrations. At each bedside in the nursing skills laboratory, there is an IBM-PC, Pioneer LVD 6000 laserdisc player and a Zenith touchscreen monitor. Now the students have a demonstration on a videodisc that they can review as they practice each skill. The student can back up, fast forward, freeze frame or review the entire demonstration. The skill demonstrations available today include bedmaking, sterile techniques, and intravenous therapy skills. They plan to eventually have 25 skills on disc. Skill demonstrations now being developed for videodisc include dangling, ambulation and range of motion.

DeAnza Community College - Continuing Education for Critical Care Nurses

As an example of what may be a trend across the country, DeAnza Community College's Critical Care Continuing Education Department is developing programs that incorporate the use of interactive video for use by nurses employed in hospitals in the San Francisco bay area. The continuing education department at De Anza, located in Cupertino, CA, has purchased one InfoWindow system and has plans to purchase as many as five more.

Declining Class Attendance. This school, a provider of continuing education in critical care for the past 15 years, has recently been plagued with decreasing enrollments in their once popular courses. The new tax law terminating the deduction of monies paid for continuing education, the addition of free continuing education provided by the hospitals, and the lack of interest in spending free-time in a classroom are stated causes of the declining enrollment.

Independent Study. The continuing education department believes that the flexibility of independent study using the exciting and stimulating medium of interac-

tive video, will be of interest to critical care nurses. Independent study modules integrating portions of interactive videodisc programs are being written. Their first interactive video program is The Training Group's demo that includes the full *First and Second Heart Sounds* program.

Use in Classroom. This program will also be incorporated as an animated AV aide in the traditional critical care orientation classes they continue to present. Critical care simulations on floppy disk are being used in the classroom by these critical care instructors today. When appropriate software is available, the InfoWindow Systems will be used by students in DeAnza's ADN program as well.

Hospital - Dixie Medical Center

Interactive Video Programs. Dixie Medical Center in St. George, Utah, has four traveling interactive videodisc stations. One is kept in the hospital library and three travel to the critical care units. When there is a slow time, especially during the evening and at night, a station is wheeled in for use. On these stations are four Intelligent Image's simulations from their Emergency/Critical Care Series, and a prototype of the program *Heart in Your Hands* from Allen Communications. The emergency room nurses are especially fascinated with the simulations. The nurse educator reports they equate the programs with playing a video game.

CAI Programs. These computers also hold two CAI programs. One is a simulation in which the nurse must diagnose and selected treatments for a variety of tachyarrhythmias. The second, *Eliminating Medication Errors*, from Computerized Educational Systems of the Florida Hospital Management Corp, is being used by nurses in all hospital units. The impact on quality control of medication errors before and after the use of this program is presently being studied.

Hospital - Lakeland Regional Medical Center

Actronics' CPR System. This hospital, using the Actronics' CPR system over the past four years, has realized a savings of \$70,000 a year in CPR instruction. The director of hospital education reports that the interactive videodisc system paid for itself in seven months. The other realized advantages are that the educators' time was freed to act as mentors, to provide follow-up training, and to analyze and validate the outcome of training.

Convincing Arguments for Technology. Administrative support was won by presenting the advantages of the system convincingly. The director argued that technologically based education systems are advantageous because they 1) increase pro-

ductivity, 2) reduce labor intensity with more suitable use of expert staff, and 3) standardize and control information, especially for legal considerations. The standardization of educational records is important in the event of a liability suit, he says. Records documenting who was trained, who did the training, who observed the performance after the training, and what was observed are important to a winning defense. Interactive videodisc programs can contribute to these important records.

Community Health - Florida Children's Medical Services

Interactive Video to Reduce Cost. In 1980, Jayne Parker, training manager, recognized that the education and training needs of 200 children's Medical Services nurses, working in 18 dispersed Florida Department of Health and Rehabilitative Service clinics could be better served using interactive videodiscs. With the diminishing allocation of Federal and state monies, training, travel time, and cost of centralized program attendance had become prohibitive. Sending one representative nurse to the training programs with the expectation that he or she could return and replicate the inservice program for the homebound staff did not work well.

Use of Interactive Videodiscs. Ten interactive videodisc programs were developed between 1981 and 1984. The programs are still being actively used by new nursing staff. Experienced staff use them for review as needed. The titles include: *Case Management of Spina Bifida, Human Genetics, Case Management of Cleft Lip and Palate, Renal Assessment, Intervention in Child Abuse and Neglect, Pediatric Cardiovascular Defects, Pediatric Hematology, Intervention with Grieving clients and Families, Court Testimony and Documentation, and Home care of the Chronically Ill Child.*

Appendix C

Directory of Videodisc Software

Learning System CPR Program (1982)

CONTACT:

Actronics Inc
Dave Grout

Actronics Inc
810 River Avenue
Pittsburgh, PA 15212
800/851-3780

SUBJECT:

CPR, Emergency Medicine.

AUDIENCE:

Medical, Nursing, and Paramedical Professionals,
Public.

GOAL:

To provide an interactive video training system which effectively teaches the skills necessary to successfully perform CPR.

DESCRIPTION:

The CPR Program provides CPR training at both "Heartsaver" and "Basic Rescuer" levels, and certification based on the American Heart Association's National Standards and Guidelines. The program consists of "classroom" lectures, practice on an electronic manikin, and testing. Material is presented on two monitors with video-taped and still-frame visuals, augmented by random-access audio. Students learn CPR skills by practicing ventilations and compressions on the electronic manikin--programmed to teach CPR from the victim's point of view.

HARDWARE:

Proprietary.

AUTHORING:

Proprietary.

AVAILABILITY:

Actronics hardware may be purchased as a desktop system (\$7995) or a cabinet system (\$9995). Courseware for CPR is \$8500; adult manikin is \$2900 (used for both CPR and Airway Management); infant manikin is \$2900.

Learning System Arrhythmia Recognition Program (1985)

CONTACT:

Actronics Inc
Dave Grout

Actronics Inc
810 River Avenue
Pittsburgh, PA 15212
800/851-3780

SUBJECT:

Emergency Medicine, Cardiology.

AUDIENCE:

Medical, Nursing, and Paramedical Professionals.

GOAL:

To provide education and training in arrhythmia recognition, itself, as well as within the context of an Advanced Cardiac Life Support (ACLS) Course.

DESCRIPTION:

This is the first module of a five-part interactive video ACLS Course which will also include Airway Management, Pharmacology, Adjuncts, and Megacode. The program is divided into background lessons, specific lessons on arrhythmia recognition and ECG monitoring, practices and tests for static and dynamic arrhythmias and therapeutic modalities. The menu-driven course provides reference banks on drugs, arrhythmias, and algorithms.

HARDWARE:

Proprietary.

AUTHORING:

Proprietary.

AVAILABILITY:

Actronics hardware may be purchased as a desktop system (\$7995) or a cabinet system (\$9995). Courseware for Arrhythmia Recognition is \$5000.

Learning System Airway Management Program (1986)

CONTACT:

Actronics Inc
Dave Grout

Actronics Inc
810 River Avenue
Pittsburgh, PA 15212
800/851-3780

SUBJECT:

Emergency Medicine.

AUDIENCE:

Medial, Nursing, and Paramedical Professionals.

GOAL:

To provide education and training in airway management and airway adjuncts.

DESCRIPTION:

This is the second module of a five-part interactive video ACLS Course which also includes Pharmacology, Megacode, Adjuncts and Arrhythmia Recognition. After a comprehensive course overview, individual lessons examine the specific elements of airway management from respiratory assessment to transtracheal catheter ventilation and cricothyrotomy. Students have the opportunity to practice procedures and insertion techniques using an electronic intubation head which senses correct placement and effective ventilations.

HARDWARE:

Proprietary.

AUTHORING:

Proprietary.

AVAILABILITY:

Actronics hardware may be purchased as a desktop system (\$7995) or a cabinet system (\$9995). Courseware for Airway Management is \$3500; adult manikin is \$2900 (used for both CPR and Airway Management); manikin for airway management only is \$2000.

Megacode (1988)

CONTACT:

Actronics Inc
Dave Grout

Actronics Inc
810 River Avenue
Pittsburgh, PA 15212
800/851-3780

SUBJECT:

Emergency Medicine.

AUDIENCE:

Medical, Nursing, and Paramedical Professionals.

GOAL:

To provide interactive instruction on the goals and objectives of the American Heart Association Advanced Cardiac Life Support (ACLS) program.

DESCRIPTION:

This is the third module of a five-part interactive video ACLS Course. Megacode consists of three didactic lessons and an interactive video simulation. The lessons are titled "ACLS in Perspective," "Acute Myocardial Infarction," and "Putting It All Together," which outlines the necessary leadership skills and treatment modalities recommended by the American Heart Association for the management of an acute cardiac emergency. The lessons provide up to two and one-half hours of instruction. The simulation provides the student with an opportunity to diagnose and treat an acute cardiac emergency by interacting with various team members on the video screen. A variety of patient scenarios are provided for the student to treat, each with different cardiac rhythms, blood pressures, or levels of consciousness.

HARDWARE:

Proprietary.

AUTHORING:

Proprietary.

AVAILABILITY:

Actronics hardware may be purchased as a desktop system (\$7995) or a cabinet system (\$9995). Courseware for Megacode is \$7900. All five modules in the ACLS course may be purchased for \$18,500.

Nursing Care of the Elderly Patient with Chronic Obstructive Pulmonary Disease (1988)

CONTACT:

American Journal of Nursing
Mary Anne Rizzolo EdD RN

American Journal of Nursing
555 West 57th Street
New York, NY 10019
212/582-8820

SUBJECT:

Nursing, Geriatrics.

AUDIENCE:

Nurse Practitioners and Nursing Students.

GOAL:

To provide an interactive patient simulation on COPD for use in nursing education and continuing education.

DESCRIPTION:

This program presents information about Martin Presley, a 73-year-old man with COPD and pneumonia. The user manages Mr. Presley's care from his emergency room admission through his stay in the ICU to his discharge. While managing Mr. Presley's care, the user can make the following diagnosis and therapeutic decisions: assess chest and lung sounds, interpret arterial blood gases, select appropriate medications, evaluate lab results, monitor oxygen therapy, and teach Mr. Presley and his wife what they need to know about COPD. Approved for Continuing Education Credit.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

IWPS.

AVAILABILITY:

From AJN for \$995.

Grieving Clients And Families (1983)

CONTACT:

Applied Interactive Technology

Applied Interactive Technology
621 Lakeland East Drive
Jackson, MS 39208
601/939-2987

SUBJECT:

Pediatrics, Counseling.

AUDIENCE:

Pediatric Nurses, Health Professionals.

GOAL:

Program is designed to: 1) Strengthen awareness of grieving dynamics, 2) Provide intervention skills for grief which is precipitated by a chronic illness, and 3) Provide intervention strategies for grief which is precipitated by a terminal illness.

DESCRIPTION:

Funded by the Florida Department of Health and Rehabilitative Services, this lesson is approximately 8 hours of interactive computer-based training. Package contains one users guide, eight lesson diskettes, and one videodisc. Approximately 28 minutes of video accompanies the lesson. Instruction is individualized and menu driven.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

AVAILABILITY:

Originally developed for Children's Medical Services in Tallahassee, Florida. Converted and marketed by AIT. Available for \$995.

Pediatric Cardiovascular Defects (1983)**CONTACT:**

Applied Interactive Technology

Applied Interactive Technology
621 Lakeland East Drive
Jackson, MS 39208
601/939-2987

SUBJECT:

Pediatrics.

AUDIENCE:

Pediatric Nurses.

GOAL:**DESCRIPTION:**

Funded by the Florida Department of Health and Rehabilitative Services, this lesson provides a pediatric cardiovascular data base which cross-references the medical and psychosocial aspects of approximately 23 specific defects. Approximately 8 hours of interactive computer-based training with one users guide, eight lesson diskettes, and one videodisc. Approximately 15 minutes of video accompanies the lesson. Instruction is individualized and menu driven.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:**AVAILABILITY:**

Originally developed for Children's Medical Services in Tallahassee, Florida. Converted and marketed by AIT. Available for \$995.

Pediatric Hematology (1983)**CONTACT:**

Applied Interactive Technology

Applied Interactive Technology
621 Lakeland East Drive
Jackson, MS 39208
601/939-2987

SUBJECT:

Pediatrics.

AUDIENCE:

Pediatric Nurses.

GOAL:

Provide health professionals with the knowledge and skills to handle hematology disorders. They will be able to: 1) educate clients and their families on hematological disorders, with emphasis on sickle cell anemia, and 2) identify appropriate case management skills for clients who receive services through referral centers.

DESCRIPTION:

Funded by the Florida Department of Health and Rehabilitative Services, this lesson is approximately 8 hours of interactive computer-based training. Package contains one users guide, four lesson diskettes, and one videodisc. Approximately 15 minutes of video accompanies the lesson. Instruction is individualized and menu driven.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:**AVAILABILITY:**

Originally developed for Children's Medical Services in Tallahassee, Florida. Converted and marketed by AIT. Available for \$995.

Home Care of the Chronically Ill Child (1986)

CONTACT:

Applied Interactive Technology

Applied Interactive Technology
621 Lakeland East Drive
Jackson, MS 39208
601/939-2987

SUBJECT:

Pediatrics.

AUDIENCE:

Community Health Nurses.

GOAL:

To provide home care and case management skills.

DESCRIPTION:

Fives modules are included: 1) making the home visit, 2) preparing a child for home care procedures, 3) child health assessment (respiratory), 4) pediatric feeding techniques (NG tubes, gastrostomy tubes), and 5) pediatric apnea monitoring. The program consists of approximately six hours of instruction and includes print material, videodisc, and floppy diskette.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

AVAILABILITY:

Originally developed for Children's Medical Services in Tallahassee, Florida. Converted and marketed by AIT. Available for \$995.

Sterile Techniques At The Bedside (1984)

CONTACT:

Applied Interactive Technology

Applied Interactive Technology
621 Lakeland East Drive
Jackson, MS 39208
601/939-2987

SUBJECT:

Patient Care.

AUDIENCE:

Nurses, Health Professionals.

GOAL:

To instruct health care professionals in the proper steps for preparing dressings and maintaining asepsis.

DESCRIPTION:

This videodisc demonstrates correct procedures for the preparation and changing of dressings while maintaining sterile conditions at the bedside. It is menu driven, with each instructional unit followed by multiple choice testing and remedial sequences. A support manual is provided.

HARDWARE:

InfoWindow and compatible systems. Also as Level II disc.

AUTHORING:

Variable.

AVAILABILITY:

Repressed in 1987. Contact ACCESS in Calgary (403/297-4908) for Level II version of disc. InfoWindow version available for \$995 from AIT; 20% discount to MDRVC Members (contact Stewart Publishing at 703/354-8155 for information on MDRVC).

Intervention In Child Abuse And Neglect (1983)

CONTACT:

Applied Interactive Technology

Applied Interactive Technology
621 Lakeland East Drive
Jackson, MS 39208
601/939-2987

SUBJECT:

Child Abuse, Human Services.

AUDIENCE:

Pediatric Nurses, Health Professionals.

GOAL:

Students will be able to: 1) Describe physical and emotional indicators of various types of child abuse or neglect, 2) Identify symptoms of abuse/neglect using observation, interpretation, and nursing assessment skills, and 3) Describe the nurse's and other health professional's responsibility to report suspicion of child abuse and neglect.

DESCRIPTION:

Funded by the Florida Department of Health and Rehabilitative Services, this lesson is approximately 6 hours of interactive computer-based training. Package contains one users guide, six lesson diskettes, and one videodisc. Approximately 28 minutes of video accompanies the lesson. Instruction is individualized and menu driven.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

AVAILABILITY:

Originally developed for Children's Medical Services in Tallahassee, Florida. Converted and marketed by AIT. Available for \$995.

Court Testimony and Documentation (1983)

CONTACT:

Applied Interactive Technology

Applied Interactive Technology
621 Lakeland East Drive
Jackson, MS 39208
601/939-2987

SUBJECT:

Child Abuse, Human Services.

AUDIENCE:

Pediatric Nurses, Health Professionals.

GOAL:

To provide Child Protection Teams (multi-disciplinary team that deals with child abuse) with skills in court testimony and documentation.

DESCRIPTION:

Funded by the Florida Department of Health and Rehabilitative Services, this lesson covers 1) the legal system, 2) on-going documentation of child abuse and neglect, 3) pretrial preparation, and 4) guidelines for effective testimony. Approximately 8 hours of interactive computer-based training with one users guide, eight lesson diskettes, and one videodisc. Approximately 28 minutes of video accompanies the lesson. Instruction is individualized and menu driven.

HARDWARE:

Non-standard system.

AUTHORING:

PASCAL.

AVAILABILITY:

Originally developed for Children's Medical Services in Tallahassee, Florida. Converted and marketed by AIT. Available for \$995.

Urinary Catheterization (1984)

CONTACT:

Applied Interactive Technology

Applied Interactive Technology
621 Lakeland East Drive
Jackson, MS 39208
601/939-2987

SUBJECT:

Patient Care.

AUDIENCE:

Nurses, Health Professionals.

GOAL:

To instruct health care professionals in the correct procedures for urinary catheterization. Includes preparation of the patient, preparation of the tray, and proper catheterization techniques for female and male patients.

DESCRIPTION:

This disc takes the student through various steps necessary to perform a successful urinary catheterization. It is menu driven, with each instructional unit followed by multiple choice testing and remedial sequences. The disc includes a segment providing instruction on how to use the videodisc player. A support manual is provided.

HARDWARE:

InfoWindow and compatible systems. Also as Level II Disc.

AUTHORING:

Variable.

AVAILABILITY:

Contact ACCESS Network in Calgary (403/297-4908) for Level II version of disc. InfoWindow version available for \$995 from AIT.

Case Management of Cleft Lip and Palate (1983)

CONTACT:

Applied Interactive Technology

Applied Interactive Technology
621 Lakeland East Drive
Jackson, MS 39208
601/939-2987

SUBJECT:

Pediatrics.

AUDIENCE:

Pediatric Nurses.

GOAL:

To provide cleft lip and palate management skills to CMS health professionals. They will be able to: 1) Describe the cleft lip and palate 2) Describe expectations for growth, development, and optional treatment of cleft lip and palate, and 3) Describe physical, medical, and psychosocial aspects of case management for short-term and long-term care.

DESCRIPTION:

Funded by the Florida Department of Health and Rehabilitative Services, this lesson is approximately 10 hours of interactive computer-based training. Package contains one users guide, six lesson diskettes, and one videodisc. Approximately 56 minutes of video accompanies the lesson. Instruction is individualized and menu driven.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

AVAILABILITY:

Originally developed for Children's Medical Services in Tallahassee, Florida. Converted and marketed by AIT. Available for \$995.

**Case Management Of Spina Bifida
(1982)****CONTACT:**

Applied Interactive Technology

Applied Interactive Technology
621 Lakeland East Drive
Jackson, MS 39208
601/939-2987

SUBJECT:

Pediatrics.

AUDIENCE:

Pediatric Nurses.

GOAL:

To instruct nurses and associated health professionals in spina bifida case management in a variety of environments.

DESCRIPTION:

Funded by the Florida Department of Health and Rehabilitative Services. Disc describes general issues including medical psychosocial, and treatment/management of spina bifida. Approximately twenty minutes of dissociated motion segments and approximately eight hundred slides and graphics on spina bifida case management are combined on a one-sided videodisc. Menu-driven lessons are individualized under computer control.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:**AVAILABILITY:**

Originally developed for Children's Medical Services in Tallahassee, Florida. Converted and marketed by AIT. Available for \$995.

**Human Genetics Training For Nurses
(1982)****CONTACT:**

Applied Interactive Technology

Applied Interactive Technology
621 Lakeland East Drive
Jackson, MS 39208
601/939-2987

SUBJECT:

Pediatrics.

AUDIENCE:

Pediatric Nurses.

GOAL:

To instruct nurses and associated health professionals in genetic diseases and disorders, as well as the nursing support role.

DESCRIPTION:

Funded by a grant from the Federal Genetic Diseases Testing and Counseling Project. Approximately twenty minutes of dissociated motion segments and approximately eight hundred slides and graphics on genetic diseases and disorders, chromosomal problems, pedigree, and nursing support roles are combined on a one-sided videodisc. Menu-driven lessons are individualized under computer control.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:**AVAILABILITY:**

Originally developed for Children's Medical Services in Tallahassee, Florida. Converted and marketed by AIT. Available for \$995.

Renal Analysis (1983)

CONTACT:

Applied Interactive Technology

Applied Interactive Technology
621 Lakeland East Drive
Jackson, MS 39208
601/939-2987

SUBJECT:

Pediatrics.

AUDIENCE:

Pediatric Nurses.

GOAL:

Students will be able to: 1) Describe risk factors involved in renal disease in children with previous urinary tract symptoms, 2) Demonstrate accurate renal analysis (microscopic exam, urine culture, dipsticks, specific gravity), and 3) Describe to patient and parents the most common renal problems and their corresponding medical action.

DESCRIPTION:

Funded by the Florida Department of Health and Rehabilitative Services, this lesson is approximately 6 hours of interactive computer-based training. Package contains one users guide, five lesson diskettes, and one videodisc. Approximately 28 minutes of video accompanies the lesson. Instruction is individualized and menu driven.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

AVAILABILITY:

Originally developed for Children's Medical Services in Tallahassee, Florida. Converted and marketed by AIT. Available for \$995.

Anatomy and Physiology of the Heart (1988)

CONTACT:

British Columbia Inst of Technology
Margaret Penney

British Columbia Inst of Technology
3700 Willingdon Avenue
Burnaby, BC V5G 3H2 CANADA
604/432-8803

SUBJECT:

Anatomy, Physiology.

AUDIENCE:

Allied Health Students.

GOAL:

To provide instruction in the basics of anatomy and physiology of the heart for health professionals such as nurses, biomedical engineers, and paramedics.

DESCRIPTION:

This Level III program covers cardiac basics, anatomy of the heart, mechanical events, cardiac physiology, regulation of cardiac output, and common cardiac pathologies. It is designed to support classroom instruction as well as individualized instruction. Accompanied by student workbook.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

TenCore.

AVAILABILITY:

Contact BCIT.

Decision Making in Nursing Practice (1989)

CONTACT:

California State University-Chico
Carol L. Leedom

California State University-Chico
First & Normal
Chico, CA 95929
916/895-5610

SUBJECT:

Nursing Diagnosis.

AUDIENCE:

Nursing Students and Nurses.

GOAL:

To provide repeated practice in applying nursing diagnosis.

DESCRIPTION:

A medical-surgical scenario allows students to practice applying the nursing diagnosis process. Four different sets of complications are randomly incorporated into the scenario.

HARDWARE:

VIEW 5000/2000.

AUTHORING:

Genesis.

AVAILABILITY:

Available September 1989.

A Right to Die (1988)

CONTACT:

Carnegie Mellon University
Robert Cavalier

Carnegie Mellon University
Building B
Pittsburgh, PA 15213
412/268-7643

SUBJECT:

Death and Dying, Medical Ethics.

AUDIENCE:

Health Professionals.

GOAL:

To provide a medium through which health professionals can explore medical ethics concerning the right to die.

DESCRIPTION:

This program presents the case of Dax Cowart--a victim of severe burns, blindness, and crippling injuries--who persists under treatment or insist that he be allowed to die. Through interviews with Dax and other principals in his case (doctors, lawyer, mother, etc.), the user investigates the basic ethical issues regarding quality of life, autonomy, competence, the obligations of medical professionals, etc. Throughout, the user must continually address the central dilemma: should Dax be granted his request to die, as well as the reasons why and why not.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

AVAILABILITY:

Available for \$2395 from the ALIVE Center, 1248 Weather Vane Lane, Akron OH 44313; 216/869-9623.

Intravenous Therapy (1988)

CONTACT:

Fuld Inst for Tech in Nrsg Educ (FITNE)
David Burke

Fuld Inst for Tech in Nrsg Educ (FITNE)
28 Station Street
Athens, OH 45701
614/592-2511

SUBJECT:

Patient Care.

AUDIENCE:

Nursing Students.

GOAL:

To teach students how to prepare, start, monitor, and discontinue intravenous infusions.

DESCRIPTION:

A Level III program designed to teach clinical skills to nursing students. Contains six chapters: 1) IV Solutions, 2) Preparing Solution and Tubing, 3) Insertion of the IV Needles, 4) Maintaining the IV Solution, 5) Discontinuing the IV Solution, and 6) Complications of IV Therapy. Includes some knowledge evaluations such as flow rates, order interpretation, and equipment identification. This touchscreen program may also be used with keyboard.

HARDWARE:

FITNE, InfoWindow, VIEW 5000, and compatible systems.

AUTHORING:

Quest.

AVAILABILITY:

Available for \$595 through FITNE.

Back Safety (1985)

CONTACT:

Health EduTech
Robert Powell

Health EduTech
7801 East Bush Lake Road #350
Minneapolis, MN 55435
612/831-0445

SUBJECT:

Occupational Health & Safety.

AUDIENCE:

Hospital Employees, Nurses.

GOAL:

To provide staff members with training regarding proper lifting techniques to avoid back injuries.

DESCRIPTION:

This program is designed to teach employees to 1) understand the structure of the back and how the back works, 2) use good body mechanics to prevent back injury, 3) explain basic principles of good body mechanics for lifting, pushing, reaching, and sitting, and 4) demonstrate the proper way to perform trunk and back exercises.

HARDWARE:

Level II Pioneer or InfoWindow, VIEW 5000/2000 or compatible systems.

AUTHORING:

Various.

AVAILABILITY:

Available for \$995 from Health Edutech or authorized dealers.

Infection Control (1985)*CONTACT:*

Health EduTech
Robert Powell

Health EduTech
7801 East Bush Lake Road #350
Minneapolis, MN 55435
612/831-0445

SUBJECT:

Occupational Health & Safety.

AUDIENCE:

Hospital Employees, Nurses.

GOAL:

To provide staff members with a working knowledge of safe practice in infection prevention and control.

DESCRIPTION:

This program is divided into chapters which cover a variety of topics. For nursing employees, the program includes Culturing, Linen Handling, Invasive Therapy, Isolation Procedure, Patient in Isolation Transfer, Wound Care, Care of Equipment, and Handling of Waste. For housekeeping employees, the program includes Handwashing/Personal Hygiene, Isolation Procedure, Floors, Walls/Furniture, Beds/Mattress, Equipment, and Handling of Waste. For Food Service Employees, the program includes Handwashing/Personal Hygiene, Storing Perishable and Non-Perishable Foods, Serving Foods, and Equipment Cleaning and Sanitization.

HARDWARE:

Level II Pioneer or InfoWindow, VIEW 5000/2000 or compatible systems.

AUTHORING:

Various.

AVAILABILITY:

Available for \$995 from Health Edutech or authorized dealers.

The Birth Disc (1989)*CONTACT:*

Image Premastering
Mike Engebretson

Image Premastering
1781 Prior Avenue North
St Paul, MN 55113
612/644-7802

SUBJECT:

Childbirth, Obstetrics.

AUDIENCE:

Health Professionals, General Public.

GOAL:

To provide a visual resource on the process of childbirth.

DESCRIPTION:

The Birth Disc is a visual database of 9,000 color and black and white photographs illustrating childbirth. This resource library documents the process of birth from pregnancy and labor, through birth itself, to the emerging newborn and the postpartum experience. A table of contents and a cross reference index helps the user locate specific images within 65 chapters and 43 case studies. Co-produced by Artemis and Image Premastering Services, Ltd.

HARDWARE:

Generic Videodisc.

AUTHORING:

Generic Disc.

AVAILABILITY:

Available for \$300 from Image Premastering Services, Ltd.

Pathophysiology of Shock (1987)

CONTACT:

Intelligent Images Inc
David Allan MD

Intelligent Images Inc
10675 Sorrento Valley Road #200
San Diego, CA 92121
800/733-1010

SUBJECT:

Emergency Medicine, Critical Care.

AUDIENCE:

Nurses and Students.

GOAL:

Upon completion of this lesson, the user will be able to 1) recognize the common pathophysiological elements of the syndrome of shock, 2) describe how normal hemodynamics are altered to produce volume, central, and peripheral reaction shock states, 3) recognize clinical signs associated with early and later stages of shock, and 4) relate presenting clinical signs to the body's shock compensation mechanism.

DESCRIPTION:

This lesson, one of eight teaching programs in the Nursing Assessment and Intervention Series, looks at physiologic effects to shock and the body's compensatory responses to the syndrome. The lesson presents the key physiologic change common to all types of shock. The clinical features of hypovolemic, septic, anaphylactic, traumatic, and cardiogenic shock, including signs and symptoms, hemodynamic changes and oxygen transport changes are given along with the specific treatment priorities. Case studies present a clinical picture consistent with shock types. The user is asked to identify the shock in each case by its physiologic response.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

C.

AVAILABILITY:

Entire set of eight programs in Nursing Assessment and Intervention Series sells for \$5,500.

Chest Trauma (1985)

CONTACT:

Intelligent Images Inc
David Allan MD

Intelligent Images Inc
10675 Sorrento Valley Road #200
San Diego, CA 92121
800/733-1010

SUBJECT:

Emergency Medicine, Critical Care.

AUDIENCE:

Nurses, Physicians, Students.

GOAL:

In this program, the user will be able to : 1) perform an initial rapid assessment, 2) establish an initial working diagnosis and modify it appropriately throughout management, 3) assess the airway and respiratory effectiveness, 4) recognize immediate threats to respiratory function, 5) prioritize airway needs in relation to shock state, 6) use X-rays to assess respiratory status, and 7) use laboratory studies to assess respiratory status (i.e. ABGs).

DESCRIPTION:

One of eight programs in the Emergency/Critical Care Series, this simulation presents a patient with respiratory distress and hypovolemic shock resulting from multiple injuries sustained in a car accident. The case requires the user to recognize the respiratory component and prioritize it with the hypovolemia. Initial assessment and stabilization take place within the first 30 minutes of arrival in the Emergency Department.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

C.

AVAILABILITY:

Entire set of eight discs that make up the Emergency/Critical Care Series sells for \$12,200.

Gun Shot Wound To The Abdomen (1984)

CONTACT:

Intelligent Images Inc
David Allan MD

Intelligent Images Inc
10675 Sorrento Valley Road #200
San Diego, CA 92121
800/733-1010

SUBJECT:

Emergency Medicine, Critical Care.

AUDIENCE:

Nurses, Physicians, Students.

GOAL:

To teach problem-solving and decision-making in the area of trauma care.

DESCRIPTION:

A library of discs is being developed in critical/emergency care. Each disc will have a patient care simulation in which the learner manages the patient, orders diagnostic and therapeutic measures, and sees the consequences of decisions. The patient can be managed in a real-time mode or at the learner's own pace. Patient flow-sheets, wave tracing, X-rays, laboratory data, etc., are available in a continually updated format. In this program, the user will be able to: 1) perform an initial rapid assessment, 2) establish an initial working diagnosis and modify it appropriately throughout management, 3) recognize the development of cardiac tamponade in a shock patient, 4) initiate monitoring measures appropriate for obstructive shock, 5) use invasive assessment procedures specific to this patient, 6) institute volume loading appropriately, and 7) transfer a stable patient to the operating room for definitive therapy.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

C.

AVAILABILITY:

Entire set of eight discs that make up the Emergency/Critical Care Series sells for \$12,200.

Diagnostic Decisions in a Patient in Shock (1985)

CONTACT:

Intelligent Images Inc
David Allan MD

Intelligent Images Inc
10675 Sorrento Valley Road #200
San Diego, CA 92121
800/733-1010

SUBJECT:

Emergency Medicine, Critical Care.

AUDIENCE:

Nurses, Physicians, Students.

GOAL:

In this program, the user will be able to : 1) perform an initial rapid assessment, 2) establish an initial working diagnosis and modify it appropriately throughout management, 3) identify the cause of shock, 4) prioritize initial stabilizing interventions, 5) evaluate adequacy of perfusion by assessing target organs, 6) initiate appropriate IV therapy, 7) initiate monitoring measures specific to cardiogenic shock, 8) request laboratory studies specific for cardiogenic shock, 9) initiate drug therapy as appropriate, and 10) expedite transfer to ICU for definitive therapy.

DESCRIPTION:

One of eight programs in the Emergency/Critical Care Series, this simulation presents a challenge in differential diagnosis. The emergency department patient has general early complaints, but over time they progress to suggest upper gastrointestinal bleeding and/or acute myocardial infarction. A unique diagnostic matrix is used to allow the user to prioritize possible diagnoses while initiating assessment and stabilization measures in response to clinical findings.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

C.

AVAILABILITY:

Entire set of eight discs that make up the Emergency/Critical Care Series sells for \$12,200.

Discontinuing Mechanical Ventilation (1986)

CONTACT:

Intelligent Images Inc
David Allan MD

Intelligent Images Inc
10675 Sorrento Valley Road #200
San Diego, CA 92121
800/733-1010

SUBJECT:

Emergency Medicine, Critical Care.

AUDIENCE:

Nurses, Physicians, Students.

GOAL:

Given a patient on mechanical ventilation, the user will be able to 1) discontinue ventilatory support by appropriate "weaning" mechanisms (oxygen, mechanical ventilation, T piece, CPAP, etc.), 2) recognize when respiratory functions are adequate for discontinuing mechanical ventilation, and 3) recognize the patient's readiness to be extubated.

DESCRIPTION:

One of eight programs in the Emergency/Critical Care Series, this simulation presents a patient who has been in the hospital a number of days and is on mechanical ventilation. The simulation begins with a patient in the ICU ready to be weaned from mechanical ventilation. Following safe weaning and extubation protocols are the essence of this simulation.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

C.

AVAILABILITY:

Entire set of eight programs in Emergency/Critical Care Series sells for \$12,200.

Patient with Diarrhea and Vomiting (1986)

CONTACT:

Intelligent Images Inc
David Allan MD

Intelligent Images Inc
10675 Sorrento Valley Road #200
San Diego, CA 92121
800/733-1010

SUBJECT:

Emergency Medicine, Critical Care.

AUDIENCE:

Nurses, Physicians, Students.

GOAL:

For a patient with hypovolemic shock secondary to dehydration, the user will be able to 1) perform an initial rapid assessment, 2) establish an initial working diagnosis and modify it appropriately, 3) recognize existence of shock and identify the cause, 4) evaluate severity of shock by assessing target organ perfusion, 5) initiate appropriate IV fluid replacement therapy, 6) initiate monitoring measures specific to hypovolemic shock, 7) request appropriate laboratory studies, and 8) initiate drug therapy as appropriate.

DESCRIPTION:

One of eight programs in the Emergency/Critical Care Series, this simulation presents a patient who arrives in the emergency department with flu-like complaints of vomiting and diarrhea. Investigation reveal hypovolemic shock from dehydration and possibly sepsis. The user is required to stabilize the patient prior to transfer to the critical care unit.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

C.

AVAILABILITY:

Entire set of eight discs that make up the Emergency/Critical Care Series sells for \$12,200.

Auscultating Breath Sounds (1987)**CONTACT:**

Intelligent Images Inc
David Allan MD

Intelligent Images Inc
10675 Sorrento Valley Road #200
San Diego, CA 92121
800/733-1010

SUBJECT:

Emergency Medicine, Critical Care.

AUDIENCE:

Nurses and Students.

GOAL:

Given a patient who is breathing spontaneously, the user will be able to 1) demonstrate correct stethoscope placement for optimal auscultation of breath sounds, 2) use a standard format in auscultating the chest and modifying it to accommodate patient variances, 3) instruct the patient in the proper breathing pattern to facilitate auscultation, 4) recognize normal breath sounds, and 5) correlate lobe anatomy with the area auscultated.

DESCRIPTION:

This lesson, one of eight teaching programs in the Nursing Assessment and Intervention Series, reviews the standard procedures to auscultate the posterior and anterior chest. Patient positions, breathing techniques, and stethoscope placement are reviewed. The three major components of the lesson are exercises designed to simulate a systematic chest exam, identify lung lobes, and identify bronchial, vesicular, and bronchovesicular breath sounds.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

C.

AVAILABILITY:

Entire set of eight programs in Nursing Assessment and Intervention Series sells for \$5,500.

Antishock Trousers (1987)**CONTACT:**

Intelligent Images Inc
David Allan MD

Intelligent Images Inc
10675 Sorrento Valley Road #200
San Diego, CA 92121
800/733-1010

SUBJECT:

Emergency Medicine, Critical Care.

AUDIENCE:

Nurses and Students.

GOAL:

Given a patient wearing antishock trousers, the user will be able to 1) describe the antishock trouser and its components (i.e. chamber, bladders, pump, etc.), 2) monitor and assess the patient in antishock trousers, 3) indicate when to initiate the deflation procedure, and 4) recognize the dangers involved if the trousers are removed incorrectly. clinical signs to the body's shock compensation mechanism.

DESCRIPTION:

This lesson, one of eight teaching programs in the Nursing Assessment and Intervention Series, defines the purpose and components of antishock trousers. The tutorial describes how they monitor and assess blood pressure, tissue perfusion, LOC, lower extremity pulses and concurrent fluid resuscitation. The dangers of suddenly removing the antishock trousers are pointed out. Given a case study and simulated antishock trousers gauge, the user must monitor and assess the patient while initiated the proper sequence of removal measures.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

C.

AVAILABILITY:

Entire set of eight programs in Nursing Assessment and Intervention Series sells for \$5,500.

IV Solutions (1987)

CONTACT:

Intelligent Images Inc
David Allan MD

Intelligent Images Inc
10675 Sorrento Valley Road #200
San Diego, CA 92121
800/733-1010

SUBJECT:

Emergency Medicine, Critical Care.

AUDIENCE:

Nurses and Students.

GOAL:

Given the need for IV therapy, the user will be able to 1) select an appropriate IV solution for a specific patient situation and 2) identify advantages/disadvantages for each of the major solutions.

DESCRIPTION:

This lesson, one of eight teaching programs in the Nursing Assessment and Intervention Series, reviews the major types of IV solutions, including properties of both colloids and crystalloids. Advantages and disadvantages of each solution are discussed. Practical application of the information is provided through the use of mini-case studies.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

C.

AVAILABILITY:

Entire set of eight programs in Nursing Assessment and Intervention Series sells for \$5,500.

Abdominal Stab Wounds (1985)

CONTACT:

Intelligent Images Inc
David Allan MD

Intelligent Images Inc
10675 Sorrento Valley Road #200
San Diego, CA 92121
800/733-1010

SUBJECT:

Emergency Medicine, Critical Care.

AUDIENCE:

Nurses, Physicians, Students.

GOAL:

In this program, the user will be able to : 1) perform an initial rapid assessment, 2) recognize immediate threats to life, 3) prioritize initial stabilizing interventions (i.e. ABCs, oxygen, IV), 4) establish an initial working diagnosis, 5) initiate basic assessment measures (i.e. labs, X-rays, diagnostic monitoring procedures), 6) prioritize resuscitation (fluids), and 7) understand criteria for fluid management.

DESCRIPTION:

One of eight programs in the Emergency/Critical Care Series, this simulation is designed to teach the initial assessment process, including the ABC's and Head-to-Toe Assessment. Time is a key element in this simulation, as the patient's condition changes radically if assessment and life-saving interventions are not conducted promptly. Complication that threaten the ABC's occur randomly to force prioritization and reprioritization of initial actions.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

C

AVAILABILITY:

Entire set of eight discs that make up the Emergency/Critical Care Series sells for \$12,200.

Motor Vehicle Trauma (1985)**CONTACT:**

Intelligent Images Inc
David Allan MD

Intelligent Images Inc
10675 Sorrento Valley Road #200
San Diego, CA 92121
800/733-1010

SUBJECT:

Emergency Medicine, Critical Care.

AUDIENCE:

Nurses, Physicians, Students.

GOAL:

In this program, the user will be able to : 1) perform an initial rapid assessment, 2) establish an initial working diagnosis and modify it appropriately throughout management, 3) recognize the existence of shock and identify the cause, 4) prioritize initial stabilizing interventions, 5) evaluate severity of shock by assessing target organs, 6) initiate monitoring measures specific to traumatic shock, 7) request appropriate X-rays, 8) use invasive procedures appropriately to assess multiple trauma patient, and 9) initiate drug therapy as appropriate.

DESCRIPTION:

One of eight programs in the Emergency/Critical Care Series, this simulation takes place in the emergency department, beginning with the admission of a multiple trauma patient in hypovolemic shock. The primary objectives are to recognize the existence of shock, identify the cause(s), and take appropriate measures to stabilize the patient prior to transferring to the ICU.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

C.

AVAILABILITY:

Entire set of eight discs that make up the Emergency/Critical Care Series sells for \$12,200.

IV Therapy (1987)**CONTACT:**

Intelligent Images Inc
David Allan MD

Intelligent Images Inc
10675 Sorrento Valley Road #200
San Diego, CA 92121
800/733-1010

SUBJECT:

Emergency Medicine, Critical Care

AUDIENCE:

Nurses and Students.

GOAL:

Given the situation of hypovolemic or cardiogenic shock, the user will be able to 1) indicate the rationale for IV therapy, 2) select an appropriate IV solution, flow rate, needle size, and IV site for initial patient management, and 3) calculate the correct drip rate for a given fluid volume order. recognizing pattern to facilitate auscultation, 4) recognize normal breath sounds, and 5) correlate lobe anatomy with the area auscultated.

DESCRIPTION:

This lesson, one of eight teaching programs in the Nursing Assessment and Intervention Series, reviews the overall goals of IV therapy, with emphasis on the management of hypovolemic shock. The lesson is problem oriented with generous use of mini0case studies to test application.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

C.

AVAILABILITY:

Entire set of eight programs in Nursing Assessment and Intervention Series sells for \$5,500.

Central Venous Pressure (1987)

CONTACT:

Intelligent Images Inc
David Allan MD

Intelligent Images Inc
10675 Sorrento Valley Road #200
San Diego, CA 92121
800/733-1010

SUBJECT:

Emergency Medicine, Critical Care.

AUDIENCE:

Nurses and Students.

GOAL:

Upon completion of this lesson, the user will be able to 1) take a CVP reading using appropriate landmarks and techniques, 2) troubleshoot high and low CVP reading for both procedural errors and system problems, and 3) identify the influence of intrathoracic dynamics on CVP measurements.

DESCRIPTION:

This lesson, one of eight teaching programs in the Nursing Assessment and Intervention Series, defines the CVP manometer and its four functions. Careful attention is given to patency of the line, stopcock settings, positioning of the zero point and physiologic factors that can alter the accurate assessment of the CV reading. The user is given a simulated patient with vital signs and asked to position the stopcock to take a CVP measurement. In a troubleshooting exercise the user encounters both low and falsely high CVP readings and must troubleshoot for procedural and system errors. Common mistakes in the measurement process are listed along with troubleshooting guidelines.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

C.

AVAILABILITY:

Entire set of eight programs in Nursing Assessment and Intervention Series sells for \$5,500.

Pathophysiology of Cardiac Tamponade (1987)

CONTACT:

Intelligent Images Inc
David Allan MD

Intelligent Images Inc
10675 Sorrento Valley Road #200
San Diego, CA 92121
800/733-1010

SUBJECT:

Emergency Medicine, Critical Care.

AUDIENCE:

Nurses and Students.

GOAL:

Upon completion of this lesson, the user will be able to 1) relate pathophysiology of cardiac tamponade to presenting signs and symptoms and 2) initiate appropriate interventions for cardiac tamponade.

DESCRIPTION:

This lesson, one of eight teaching programs in the Nursing Assessment and Intervention Series, provides three cases which demonstrate how the clinical syndrome presents itself and when to suspect tamponade. Given specific physiologic parameters, the user anticipates changes in the patient's condition. The program discusses the types of injuries likely to produce tamponade and describes appropriate interventions and their rationale.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

C.

AVAILABILITY:

Entire set of eight programs in Nursing Assessment and Intervention Series sells for \$5,500.

Initial Assessment of Respiratory Difficulty (1987)

CONTACT:

Intelligent Images Inc
David Allan MD

Intelligent Images Inc
10675 Sorrento Valley Road #200
San Diego, CA 92121
800/733-1010

SUBJECT:

Emergency Medicine, Critical Care.

AUDIENCE:

Nurses, Physicians, Students.

GOAL:

To provide a simulated patient to train physicians and nurses in emergency medicine.

DESCRIPTION:

One of eight programs in the Emergency/Critical Care Series, this simulation takes place over a two-day period in the intensive care unit. The patient, a passenger in a motor vehicle accident, has a lung contusion that requires the use of CPAP. The user must make continued assessments and update his/her diagnoses and treatment plans. There are over 300 different choices available to the user. At the completion of the simulation, a summary of the performance is given. The evaluation includes a detailed account of the costs incurred, which are compared to an expert clinician's costs.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

C.

AVAILABILITY:

Entire set of eight discs that make up the Emergency/Critical Care Series sells for \$12,200.

Chest Tubes (1987)

CONTACT:

Intelligent Images Inc
David Allan MD

Intelligent Images Inc
10675 Sorrento Valley Road #200
San Diego, CA 92121
800/733-1010

SUBJECT:

Emergency Medicine, Critical Care.

AUDIENCE:

Nurses and Students.

GOAL:

Upon completion of this lesson, the user will be able to 1) recognize indications for using chest tubes, 2) identify intrathoracic dynamics related to changes in underwater seal chamber, 3) identify mechanisms associated with air leaks, 4) relate the amount of chest tube drainage to the patient's clinical condition.

DESCRIPTION:

This lesson, one of eight teaching programs in the Nursing Assessment and Intervention Series, provides a review of intrathoracic dynamics and the physical dynamics of chest tubes. Primary emphasis is placed on ensuring proper tube function and recognizing and correcting problems with the drainage system. A major component of the lesson is an exercise designed to test application of the principles contained in the lesson.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

C.

AVAILABILITY:

Entire set of eight programs in Nursing Assessment and Intervention Series sells for \$5,500.

Introduction to Cardiovascular Examination (1987)

CONTACT:

Mirror Systems
Mark Tayloy

Mirror Systems, Inc.
2067 Massachusetts Avenue
Cambridge, MA 02140
617/661-0777

SUBJECT:

Anatomy, Physiology.

AUDIENCE:

Medical, Nursing, and Allied Health Students.

GOAL:

To provide instruction on the anatomy and physiology of the heart, auscultation of the heart, and abnormal heart sounds and murmurs.

DESCRIPTION:

Developed by Mirror Systems, Inc., this program provides two to four hours of instructional content for use by a broad range of medical and healthcare professionals. The course allows the student a high degree of interactivity with images and text through touch sensitive controls, as well as the ability to navigate through the system at an individualized pace. The system supports questioning of the student for score reporting and instructor evaluation.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

AVAILABILITY:

Distribution discontinued 12/1/89

Prevention of Occupational Exposure to AIDS (1988)

CONTACT:

Professional Training Systems Inc
John Hayes

Professional Training Systems Inc
400 Colony Square - Suite 1525
Atlanta, GA 30361
404/872-9700

SUBJECT:

AIDS, Occupational Health & Safety.

AUDIENCE:

Healthcare Workers.

GOAL:

To train healthcare professionals how to protect themselves from exposure to the HIV.

DESCRIPTION:

This program explains what causes AIDS, how HIV is and is not transmitted, and how healthcare workers should protect themselves from exposure. The program specifies precautions to be used with all patients by healthcare workers who come in contact with blood and body fluids. The course is designed to meet OSHA training requirements related to HIV and other blood-borne diseases such as Hepatitis B.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

PIDAS.

AVAILABILITY:

Available for \$1,600 from PTS and authorized dealers.

Care Basics for Nursing Assistants (1988)

CONTACT:

Professional Training Systems Inc
John Hayes

Professional Training Systems Inc
400 Colony Square - Suite 1525
Atlanta, GA 30361
404/872-9700

SUBJECT:

Nursing.

AUDIENCE:

Nursing Assistants.

GOAL:

To provide training and support to nursing assistants in long-term care facilities.

DESCRIPTION:

This program is an introductory course to meet training needs of nursing assistants working in long-term care. It includes an introduction to LTC, human relations and communication skills, legal and ethical issues (including residents' rights), observation, reporting and recording, infection control, fire safety and accident prevention, and body mechanics, pivot transfer and ambulation.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

PIDAS.

AVAILABILITY:

Available for \$1,600 from PTS and authorized dealers

Balancing for Diabetic Control (1986)

CONTACT:

Stewart Publishing Inc.
Scott Stewart

Stewart Publishing Inc.
6471 Merritt Court
Alexandria, VA 22312
703/354-8155

SUBJECT:

Diabetics, Patient Care.

AUDIENCE:

Nursing Students.

GOAL:

To teach students the principles of diabetic management so that they can assist diabetic clients with self management.

DESCRIPTION:

Developed at the University of Cincinnati. Students are introduced to the concept of diabetic control via the advanced organizer of a seesaw. Two case studies are then presented via videodisc, with the primary case concerning an adolescent patient. Decisions are required from the students regarding the hyper or hypoglycemic status of the patient, and tutorial information is presented. Various adolescent concerns (such as alcohol, drugs, and exercise) can be explored through the use of the videodisc by viewing actual outcomes of selected behaviors. The program concludes with principles of insulin administration primarily presented via computer graphics.

HARDWARE:

Two-screen PC w/Pioneer 6000 Series Player.

AUTHORING:

PC Pilot.

AVAILABILITY:

Available for \$500 from Stewart Publishing.

Suicidal Adolescent: Identification, Risk Assessment, & Intervention (1986)

CONTACT:

Stewart Publishing Inc.
Scott Stewart

Stewart Publishing Inc.
6471 Merritt Court
Alexandria, VA 22312
703/354-8155

SUBJECT:

Counseling, Psychiatry.

AUDIENCE:

Medical, Nursing, Health Sciences Students.

GOAL:

To produce a prototype technology-based curriculum in mental health.

DESCRIPTION:

Three videodisc sides present simulated teenage patients with symptoms of depression and risk of suicide. Videodisc and computer programs also present statistics on suicide, definitions of depression, and a lexicon for the field. Using students are able to direct interviews with simulated patients and make judgments regarding diagnosis and treatment. Developed by the National Institute of Mental Health.

HARDWARE:

Two-screen PC, InfoWindow, and compatible systems.

AUTHORING:

C.

AVAILABILITY:

Available for \$350 from Stewart Publishing, Inc.

Health History/Physical Exam of the Diabetic Patient (1987)

CONTACT:

Stewart Publishing Inc.
Scott Stewart

Stewart Publishing Inc.
6471 Merritt Court
Alexandria, VA 22312
703/354-8155

SUBJECT:

Diabetes, Patient Care.

AUDIENCE:

Nursing Students.

GOAL:

To allow students to practice interviewing skills followed by an examination of those systems of particular importance to diabetics.

DESCRIPTION:

Developed at the University of Cincinnati, this program allows users to query a middle-aged female diabetic regarding her patient history. Areas of the history requiring further investigation are highlighted for the physical exam. The physical exam portion of the program demonstrates physical assessment techniques used to explore those systems most likely to have abnormalities related to diabetes mellitus.

HARDWARE:

Two-screen PC w/Pioneer 6000 Series Player.

AUTHORING:

PC Pilot.

AVAILABILITY:

Available for \$600.

First and Second Heart Sounds (1988)

CONTACT:

The Training Group
Wayne Osbaldeston

The Training Group
Suite 202 - 4220 98th Street
Edmonton, ALB T6E 6A1 CANADA
403/462-6365

SUBJECT:

Cardiology.

AUDIENCE:

Medical Students, Nursing Students, Health Professionals.

GOAL:

To provide an interactive lesson on specific aspects of cardiology.

DESCRIPTION:

This program uses simulation and tutorial to provide students with an understanding of heart sound intensity, timing, and auscultation technique. Various hemodynamic events related to the sounds are presented through video simulation. The student then auscultates patients by touching various chest locations on the computer screen. One in a series of 12 lessons in cardiology.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

TenCore.

AVAILABILITY:

Available for \$795 from The Training Group and authorized dealers.

Mitral Stenosis (1988)

CONTACT:

The Training Group
Wayne Osbaldeston

The Training Group
Suite 202 - 4220 98th Street
Edmonton, ALB T6E 6A1 CANADA
403/462-6365

SUBJECT:

Cardiology.

AUDIENCE:

Medical Students, Nursing Students, Health Professionals.

GOAL:

To provide an interactive lesson on specific aspects of cardiology.

DESCRIPTION:

This program allows a student to develop the consequences which will follow the creation or establishment of the heart defect Mitral Stenosis. By the end of the program, the student will have worked out the physical signs, symptoms, and results of simple investigations required when faced with this clinical problem. One in a series of 12 programs on cardiology.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

TenCore.

AVAILABILITY:

Available for \$795 from The Training Group and others.

Atrial Septal Defect (1988)

CONTACT:

The Training Group
Wayne Osbaldeston

The Training Group
Suite 202 - 4220 98th Street
Edmonton, ALB T6E 6A1 CANADA
403/462-6365

SUBJECT:

Cardiology.

AUDIENCE:

Medical Students, Nursing Students, Health Professionals.

GOAL:

To provide an interactive lesson on specific aspects of cardiology.

DESCRIPTION:

This program allows a student to develop the consequences which will follow the creation or establishment of the heart defect Atrial Septal Defect. By the end of the program, the student will have worked out the physical signs, symptoms, and results of simple investigations required when faced with this clinical problem. One in a series of 12 programs on cardiology.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

TenCore.

AVAILABILITY:

Available for \$795 from The Training Group and others.

Aortic Incompetence (1988)

CONTACT:

The Training Group
Wayne Osbaldeston

The Training Group
Suite 202 - 4220 98th Street
Edmonton, ALB T6E 6A1 CANADA
403/462-6365

SUBJECT:

Cardiology.

AUDIENCE:

Medical Students, Nursing Students, Health Professionals.

GOAL:

To provide an interactive lesson on specific aspects of cardiology.

DESCRIPTION:

This program allows a student to develop the consequences which will follow the creation or establishment of the heart defect Aortic Incompetence. By the end of the program, the student will have worked out the physical signs, symptoms, and results of simple investigations required when faced with this clinical problem. One in a series of 12 programs on cardiology.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

TenCore.

AVAILABILITY:

Available for \$795 from The Training Group and others.

Dysrhythmia Training and Evaluation (1988)

CONTACT:

The Training Group
Wayne Osbaldeston

The Training Group
Suite 202 - 4220 98th Street
Edmonton, ALB T6E 6A1 CANADA
403/462-6365

SUBJECT:

Cardiology.

AUDIENCE:

Paramedics, Physicians, Nurses.

GOAL:

To provide interactive instruction on the reading and interpretation of electrocardiograms.

DESCRIPTION:

This program provides a personal, self-paced instructional course on electrocardiography (EKG). Topics include basic electrocardiography, general distinction of graph functions which allow the student to detect heart patterns, waves and measures which track heart valve patterns, normal and abnormal heart patterns and characteristics, how to interpret wave sheets, and case studies of patients with specific problems. The course also allows the instructor to enter into the program and change the case studies and program exams.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

TenCore.

AVAILABILITY:

Available for \$1,995 from The Training Group and authorized dealers.

Mitral Incompetence (1988)

CONTACT:

The Training Group
Wayne Osbaldeston

The Training Group
Suite 202 - 4220 98th Street
Edmonton, ALB T6E 6A1 CANADA
403/462-6365

SUBJECT:

Cardiology.

AUDIENCE:

Medical Students, Nursing Students, Health Professionals.

GOAL:

To provide an interactive lesson on specific aspects of cardiology.

DESCRIPTION:

This program allows a student to develop the consequences which will follow the creation or establishment of the heart defect Mitral Incompetence. By the end of the program, the student will have worked out the physical signs, symptoms, and results of simple investigations required when faced with this clinical problem. One in a series of 12 programs on cardiology.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

TenCore.

AVAILABILITY:

Available for \$795 from The Training Group and others.

Aortic Stenosis (1988)

CONTACT:

The Training Group
Wayne Osbaldeston

The Training Group
Suite 202 - 4220 98th Street
Edmonton, ALB T6E 6A1 CANADA
403/462-6365

SUBJECT:

Cardiology.

AUDIENCE:

Medical Students, Nursing Students, Health Professionals.

GOAL:

To provide an interactive lesson on specific aspects of cardiology.

DESCRIPTION:

This program allows a student to develop the consequences which will follow the creation or establishment of the heart defect Aortic Stenosis. By the end of the program, the student will have worked out the physical signs, symptoms, and results of simple investigations required when faced with this clinical problem. One in a series of 12 programs on cardiology.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

TenCore.

AVAILABILITY:

Available for \$795 from The Training Group and others.

Abnormal Electrocardiogram (1988)

CONTACT:

The Training Group
Wayne Osbaldeston

The Training Group
Suite 202 - 4220 98th Street
Edmonton, ALB T6E 6A1 CANADA
403/462-6365

SUBJECT:

Cardiology.

AUDIENCE:

Medical Students, Nursing Students, Health Professionals.

GOAL:

To provide an interactive lesson on specific aspects of cardiology.

DESCRIPTION:

This program gives the student an understanding of the abnormal electrocardiogram. The student is asked to predict electrocardiographic changes associated with various abnormalities in the atria and ventricles, including bundle branch blocks and infarcts. One in a series of 12 programs on cardiology.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

TenCore.

AVAILABILITY:

Available for \$795 from The Training Group and others.

Normal Electrocardiogram (1988)

CONTACT:

The Training Group
Wayne Osbaldeston

The Training Group
Suite 202 - 4220 98th Street
Edmonton, ALB T6E 6A1 CANADA
403/462-6365

SUBJECT:

Cardiology.

AUDIENCE:

Medical Students, Nursing Students, Health Professionals.

GOAL:

To provide an interactive lesson on specific aspects of cardiology.

DESCRIPTION:

This program provides an understanding of basic electrocardiography. The student is guided through the various "phenomena" which influence the electrocardiogram and is given the opportunity, through simulation, to use an ECG machine and do a 12 lead ECG recording. One in a series of 12 programs on cardiology.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

TenCore.

AVAILABILITY:

Available for \$795 from The Training Group and others.

Heart Murmurs and Other Sounds (1988)

CONTACT:

The Training Group
Wayne Osbaldeston

The Training Group
Suite 202 - 4220 98th Street
Edmonton, ALB T6E 6A1 CANADA
403/462-6365

SUBJECT:

Cardiology.

AUDIENCE:

Medical Students, Nursing Students, Health Professionals.

GOAL:

To provide an interactive lesson on specific aspects of cardiology.

DESCRIPTION:

This program provides the student with an understanding of the hemodynamic events associated with added heart sounds and murmurs. The student listens to these sounds by auscultating simulated patients on the computer. One in a series of 12 lessons in cardiology.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

TenCore.

AVAILABILITY:

Available for \$795 from The Training Group and authorized dealers.

Pulmonary Stenosis (1988)

CONTACT:

The Training Group
Wayne Osbaldeston

The Training Group
Suite 202 - 4220 98th Street
Edmonton, ALB T6E 6A1 CANADA
403/462-6365

SUBJECT:

Cardiology.

AUDIENCE:

Medical Students, Nursing Students, Health Professionals.

GOAL:

To provide an interactive lesson on specific aspects of cardiology.

DESCRIPTION:

This program allows a student to develop the consequences which will follow the creation or establishment of the heart defect Pulmonary Stenosis. By the end of the program, the student will have worked out the physical signs, symptoms, and results of simple investigations required when faced with this clinical problem. One in a series of 12 programs on cardiology.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

TenCore.

AVAILABILITY:

Available for \$795 from The Training Group and others.

Patent Ductus Arteriosus (1988)

CONTACT:

The Training Group
Wayne Osbaldeston

The Training Group
Suite 202 - 4220 98th Street
Edmonton, ALB T6E 6A1 CANADA
403/462-6365

SUBJECT:

Cardiology.

AUDIENCE:

Medical Students, Nursing Students, Health Professionals.

GOAL:

To provide an interactive lesson on specific aspects of cardiology.

DESCRIPTION:

This program allows a student to develop the consequences which will follow the creation or establishment of the heart defect Patent Ductus Arteriosus. By the end of the program, the student will have worked out the physical signs, symptoms, and results of simple investigations required when faced with this clinical problem. One in a series of 12 programs on cardiology.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

TenCore.

AVAILABILITY:

Available for \$795 from The Training Group and others.

Ventricular Septal Defect (1988)**CONTACT:**

The Training Group
Wayne Osbaldeston

The Training Group
Suite 202 - 4220 98th Street
Edmonton, ALB T6E 6A1 CANADA
403/462-6365

SUBJECT:

Cardiology.

AUDIENCE:

Medical Students, Nursing Students, Health Professionals.

GOAL:

To provide an interactive lesson on specific aspects of cardiology.

DESCRIPTION:

This program allows a student to develop the consequences which will follow the creation or establishment of the heart defect Ventricular Septal Defect. By the end of the program, the student will have worked out the physical signs, symptoms, and results of simple investigations required when faced with this clinical problem. One in a series of 12 programs on cardiology.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

TenCore.

AVAILABILITY:

Available for \$795 from The Training Group and others.

Managing the Experience of Labor and Delivery (1989)**CONTACT:**

Univ of Cincinnati Medical Center
Betsy Weiner

Univ of Cincinnati Medical Center
231 Bethesda Avenue
Cincinnati, OH 45267
513/558-0183

SUBJECT:

Obstetrics.

AUDIENCE:

Nursing Students and Nurses.

GOAL:

To allow students to practice their decision-making skills regarding the management of labor and delivery. May also be used as a refresher for practicing nurses.

DESCRIPTION:

The user is introduced to the laboring patient and her husband as she is being admitted to the hospital. As the case unfolds, the student selects information for assessment purposes and, in some cases, is required to participate in the data collection process. As labor progresses on an hourly basis, the student selects appropriate interventions. Module One, Labor Management, ends with the delivery of the infant. Module Two deals with Delivery Management. Special features of the program include a graphic overlay of the fetus over the mother's abdomen, fetal monitor assessments, varying patient behaviors during labor and delivery, placental examination, APGAR scoring, position and descent of the fetus into the birth canal, and graphic depiction of clinical data.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

IWPS.

AVAILABILITY:

Pending.

Health Care for Older Adults: An Overview for Nurses (1988)

CONTACT:

Univ of Texas Medical Branch
Mary Anne Sweeney

Univ of Texas Medical Branch
School of Nursing
Galveston, TX 77550
409/761-4801

SUBJECT:

Geriatrics.

AUDIENCE:

Nurses and other Healthcare Professionals.

GOAL:

To increase the awareness of health professionals regarding older adults.

DESCRIPTION:

The production of this program was supported, in part, by the Division of Nursing, U.S. Public Health Services, Department of Health and Human Services. The instructional content relates to geriatrics and is divided into seven modules: 1) Nutrition and Health Promotion, 2) Ethical and Legal Issues, 3) Facts and Figures on Aging, 4) Theories of Aging, 5) Aging and the Humanities, 6) Normal Aging Process, and 7) Physical Assessment. Each module is designed to accommodate both basic and advanced level clinicians. Learners are provided with a great deal of flexibility within the structure and they can move back and forth among the different branches of the module in any order they choose.

HARDWARE:

InfoWindow and compatible systems.

AUTHORING:

Quest.

AVAILABILITY:

Availability pending. Contact UTMB.

Cardiovascular Resources Disc (1989)

CONTACT:

Univ of Washington
John Bolles MS

Univ of Washington
T-252 HSB (SB-56)
Seattle, WA 98195
206/545-1170

SUBJECT:

Cardiology.

AUDIENCE:

Nursing and Medical Students.

GOAL:

To provide a visual resource to teach cardiovascular medicine and nursing.

DESCRIPTION:

This two-sided disc contains approximately 4000 slides covering anatomy, physiology, embryology, microscopic and gross pathology, introductions to care environments and common techniques in the assessment and treatment of cardiovascular disorders. There are also approximately 500 electrocardiograms and arrhythmias, 200 radiographs and angiograms, 50 echocardiograms, and numerous motion sequences showing patients with various signs and symptoms of cardiovascular disease and techniques for diagnosing and managing cardiovascular disease. Includes a printed catalog of images.

HARDWARE:

Generic Disc.

AUTHORING:

Generic Disc.

AVAILABILITY:

Available for \$300 from the University of Washington. Call the ORDER DEPARTMENT at 206/545-1186.

Appendix D

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Secretary of the Department of Health and Human Services' Commission on Nursing, (December, 1988) *Final Report of the Secretary's Commission on Nursing*. Office of the Secretary, Washington, DC.